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SEED-TESTERS AT WORK IN THE DEPARTMENT'S SEED TESTING STATION.

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Editor: C. W. Winders, B.Sc.Agr.

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Tuberculosis-Free Cattle Herds.

The studs listed below have fulfilled the conditions of the Department's Tuberculosis-free Herd Scheme to 31st July, 1957.

Aberdeen Angus.

G. H. & H. J. Crothers, "Moorenbah," Dirranbandi
A. G. Elliott, "Ooraine," Dirranbandi
W. H. C. Mayne, "Gibraltar," Texas

A.I.S.

M. E. & E. Scott, "Wattlebrae" A.I.S. Stud, Kingaroy
F. B. Sullivan, "Fermanagh," Pittsworth
D. Sullivan, "Bantry" Stud, Rossvale, *via* Pittsworth
W. Henschell, "Yarranvale," Yarranlea
Con. O'Sullivan, "Navillus" Stud, Greenmount
H. V. Littleton, "Wongalea" Stud, Hillview, Crow's Nest
J. Phillips and Sons, "Sunny View," Benair, *via* Kingaroy.
Sullivan Bros., "Valera" Stud, Pittsworth
Reushle Bros., "Reubydale" Stud, Ravensbourne
H. F. Marquardt, "Chelmer" Stud, Wondai
A. C. and C. R. Marquardt, "Cedar Valley," Wondai
A. H. Sokoll, "Sunny Crest" Stud, Wondai
W. and A. G. Scott, "Welena" A.I.S. Stud, Blackbutt
G. Sperling, "Kooravale" Stud, Kooralgin, *via* Cooyar
C. J. Schloss, "Shady Glen," Rocky Creek, Yarraman
W. H. Thompson, "Alfa Vale," Nanango
S. R. Moore, Sunnyside, West Wooroolin
H.M. State Farm, Numinbah
Edwards Bros., "Spring Valley" A.I.S. Stud, Kingaroy
D. G. Neale, "Grovely," Greenmount
A. W. Wieland, "Milhaven" A.I.S. Stud, Milford, *via* Boonah
W. D. Davis, "Wamba" Stud, Chinchilla
Queensland Agricultural High School and College, Lawes
C. K. Roche, Freestone, Warwick
Mrs. K. Henry, Greenmount
D. B. Green, "Deloraine" Stud, Durong, Proston
E. Evans, Wootha, Maleny
T. L. and L. M. J. Cox, "Seafield Farm," Wallumbilla
J. Crookey, "Arolla" A.I.S. Stud, Fairview, Allora
M. F. Power, "Barfield," Kapaldo
A. H. Webster, "Millievale," Derrymore
W. H. Sanderson, "Sunlit Farm," Mulgildie
R. A. and N. K. Shelton, "Vuegon" A.I.S. Stud, Hivesville, *via* Murgon
R. R. Radel & Sons, "Happy Valley," Coalstoun Lakes
C. A. Heading, "Wilga Plains," Maleny
G. S. and E. Mears, "Morden," M.S. 755, Toogoolawah

Ayrshire.

L. Holmes, "Benbecula," Yarranlea
J. N. Scott, "Auchen Eden," Camp Mountain
E. Mathie and Son, "Ainslie" Ayrshire Stud, Maleny
C. E. R. Dudgeon, "Marionville" Ayrshire Stud, Landsborough
G. F. H. Zerner, "Pineville," Pie Creek, Box 5, P.O., Gympie
T. F. Dunn, Alanbank, Gleneagle

Friesian.

C. H. Naumann, "Yarrabine" Stud, Yarraman
D. J. Pender, "Camelot," Lytton road, Lindum
S. E. G. Macdonald, "Freshfields," Marburg

Guernsey.

C. D. Holmes, "Springview," Yarraman
A. B. Fletcher, Cossart Vale, Boonah
W. H. Doss, Degilbo, *via* Biggenden
A. C. Swendson, Coolabunia, Box 26, Kingaroy
C. Scott, "Coralgrae," Din Din Road, Nanango
R. J. Wissemann, "Robnea," Headington Hill, Clifton
G. L. Johnson, "Old Cannindah," Monto
A. Ruge & Sons, Woowoonga, *via* Biggenden
G. Miller, Armagh Guernsey Stud, Armagh, M.S. 428, Grantham
N. H. Sanderson, "Eden Valley," Monto

Jersey.

Queensland Agricultural High School and College, Lawes
J. S. McCarthy, "Glen Erin" Jersey Stud, Greenmount
J. F. Lau, "Rosallen" Jersey Stud, Goombungee
G. Harley, Hopewell, M.S. 189, Kingaroy
Toowoomba Mental Hospital, Willowburn
Farm Home for Boys, Westbrook
P. J. L. Bygrave, "The Craigan Farm," Aspley
R. J. Crawford, "Inverlaw" Jersey Stud, Inverlaw, Kingaroy
P. H. F. Gregory, "Carlton," Rosevale, *via* Rosewood
E. A. Matthews, "Yarradale," Yarraman
A. L. Semgreen, "Tecoma," Coolabunia
L. E. Meier, "Ardath" Stud, Boonah
A. M. and L. J. Noone, "Winbirra" Stud, Mt. Esk Pocket, Esk
W. S. Conochie and Sons, "Brookland" Stud, Sherwood road, Sherwood
Estate of J. A. Scott, "Kiaora," Manumbar road, Nanango
F. W. Verrall, "Coleburn," Walloon
C. Beckingham, Trouts road, Everton Park
W. E. O. Meir and Son, "Kingsford" Stud, Alberton, *via* Yatala
G. H. Ralph, "Ryecombe," Ravensbourne
Mrs. I. L. M. Borchert, "Willowbank" Jersey Stud, Kingaroy
W. and C. E. Tudor, "Boree" Jersey Stud, M.S. 498, Gayndah
Weldon Bros., "Gleneden" Jersey Stud, Upper Yarraman
D. R. Hutton, "Bellgarth," Cunningham, *via* Warwick
J. W. Carpenter, Flagstone Creek, Helidon
H. G. Johnson, "Windsor" Jersey Stud, Beaudesert
W. S. Kirby, Tinana, Maryborough
S. A. Cramb, Bridge st., Wilsonton, *via* Toowoomba
G. & V. Beattie, "Beauvern," Antigua, Maryborough
J. A. & E. E. Smith, "Heatherlea" Jersey Stud, Chinchilla
W. C. M. Birt, "Pine Hill" Jersey Stud, Gundiah
T. Nock, Dallarnil
P. Fowler & Sons, "Northlea," Coalstoun Lakes
F. Porter, Conondale
H.M. State Farm, Palen Creek
B. T. Seymour, "Upwell" Jersey Stud, Mulgeldie

Polled Hereford.

W. Maller, "Boreview," Pickanjinnie
J. H. Anderson, "Inverary," Yandilla
D. R. and M. E. Hutton, "Bellgarth," Cunningham, *via* Warwick.
E. W. G. McCamley, Eulogie Park, Dululu
Wilson and McDouall, Calliope Station, Calliope

Brucellosis-Tested Swine Herds

(As at 31st July, 1957).

Berkshire.

A. P. and N. Beatty, "Deepdene," Baramba road, Nanango
S. Cochrane, "Stanroy" Stud, Felton
J. L. Handley, "Meadow Vale" Stud, Lockyer
O'Brien and Hickey, "Kildurham" Stud, Jandowae East
G. C. Traves, "Wynwood" Stud, Oakey
Westbrook Farm Home for Boys, Westbrook
H.M. State Farm, "Palen" Stud, Palen Creek
A. R. Ludwig and Sons, "Beau View" Stud, Beaudesert
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
R. H. Crawley, "Rockthorpe" Stud, *via* Pittsworth
F. R. J. Cook, Middle Creek, Pomona
Mrs. I. M. James, "Kenmore" Stud, Cambooya
H. L. Stark, "Florida," Kalbar
J. H. N. Stoodley, "Stoodville," Ormiston
H.M. State Farm, Numinbah
G. L. Gabanko and R. H. Atkins, "Diamond Valley" Stud, Mooloolah
L. Puschmann, "Tayfeld" Stud, Taylor
C. E. Edwards, "Spring Valley" Stud, Kingaroy
H. H. Sellars, "Allambie" Stud, Tabooba, Beaudesert
E. J. Clarke, Mt. Alford, via Boonah
G. McLennan, "Murcott" Stud, Willowvale
C. F. W. and B. A. Shellback, "Redvilla" Stud, Kingaroy
J. C. Lees, "Bridge View" Stud, Yandina
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
A. C. Fletcher, "Myola" Stud, Jimbour
Q.A.H.S. and College, Lawes
E. F. Smythe, "Grandmere" Stud, Manyung, Murgon
M. F. Callaghan, Lower Mount Walker, *via* Rosewood
E. R. Kimber, Block 11, Mundubbera
A. J. Potter, "Woodlands," Inglewood
Regional Experiment Station, Hermitage
J. W. Bukowski, "Secreto" Stud, Oxley
R. Astbury, "Rangvilla," Pechey
L. Pick, Mulgildie
D. G. Grayson, Killarney
A. French, "Wilson Park," Pittsworth
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands Rangeville, Toowoomba

Large White.

H. J. Franke and Sons, "Delvue" Stud, Cawdor
Garrawin Stud Farm Pty. Ltd., 657 Sandgate road, Clayfield
J. A. Heading, "Highfields," Murgon
R. Postle, "Yarralla" Stud, Pittsworth
B. J. Jensen, "Bremerside" Stud, Rosevale, *via* Rosewood.
E. J. Bell, "Dorne" Stud, Chinchilla
L. C. Lobegeiger, "Bremer Valley" Stud, Moorang, *via* Rosewood.
H. R. Gibson, "Thistleton" Stud, Maleny
H.M. State Farm, Numinbah
V. P. McGoldrick, "Fairymeadow" Stud, Cooroy
S. T. Fowler, "Kenstan" Stud, Pittsworth
W. Zahnow, Rosevale, *via* Rosewood
Regional Experiment Station, Biloela
G. J. Hutton, "Grajea" Stud, Cabalah
H. L. Larsen, "Oakway," Kingaroy
A. Palmer, "Remlap," Greenmount
G. I. Skyring, "Bellwood" Stud, *via* Pomona
G. Pampling, Watch Box road, Goomeri
M. Hall, "Milena" Stud, D'Aguilar
O. B. Vidler, Manneum, Kingaroy
K. F. Stumer, French's Creek, Boonah
Q.A.H.S. and College, Lawes
R. S. Powell, "Kybong" Stud, Kybong, *via* Gympie
C. Wharton, "Central Burnett" Stud, Gayndah
S. Jensen, Rosevale, *via* Rosewood
V. V. Radel, Coalstoun Lakes
H. R. Stanton, Tansey, *via* Goomeri
L. Stewart, Mulgowie, *via* Laidley
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
O. J. Horton, "Manneum Brae" Stud, Manneum, Kingaroy
B. F. Jensen, Rosevale
Dr. B. J. Butcher and A. J. Parnwell, 684 Logan road, Greenslopes, Brisbane
R. Kennard, Collar Stud, Warwick
A. C. H. Gibbons, Mt. Glorious
A. Kanowski, "Exton," Pechey
L. C. and E. Wieland, Lower Cressbrook
P. L. and M. T. D. Hansen, "Regal" Stud, Oaklands, Rangeville, Toowoomba.

Tamworth.

D. F. L. Skersan, "Waverley" Stud, Kaimkillenbun
A. C. Fletcher, "Myola" Stud, Jimbour
Salvation Army Home for Boys, "Canaan" Stud, Riverview
Department of Agriculture and Stock, Regional Experiment Station, Kairi
E. C. Phillips, "Sunny View," M.S. 90, Kingaroy
F. N. Hales, Kerry road, Beaudesert
T. A. Stephen, "Withcott," Helidon
W. F. Kajewski, "Glenroy" Stud, Glencoe
A. Herbst, "Hillbanside" Stud, Bahr Scrub, *via* Beenleigh
F. Thomas, "Rosevale" Stud, M.S. 373, Beaudesert
H. J. Armstrong, "Alhambra," Crownthorpe, Murgon
R. H. Coller, Tallegalla, *via* Rosewood
D. V. and P. V. Campbell, "Lawn Hill," Lamington
S. Kanowski, "Miecho" Stud, Pinelands
N. R. Potter, "Actonvale" Stud, Wellcamp
L. C. and E. Wieland, Lower Cressbrook

Wessex Saddleback.

W. S. Douglas, "Greylight" Stud, Goombungee
C. R. Smith, "Belton Park" Stud, Nara
D. T. Law, "Rossvill" Stud, Trouts road, Aspley
J. B. Dunlop, "Kurrawyn" Stud, Acacia road, Kuraby
M. Nielsen, "Cressbrook" Stud, Goomburra
G. J. Cooper, "Cedar Glen" Stud, Yarraman
"Wattledale" Stud, 492 Beenleigh road, Sunnybank
Kruger and Sons, "Greyhurst," Goombungee
A. Scott, "Wanstead" Stud, Grantham
G. C. Burnett, "Rathburnie," Linville

Closing the Gaps

By F. C. COLEMAN, Director of Field Services, Division of Dairying.

Officers of the Division of Dairying perform many duties, but perhaps two of the most important are connected with quality improvement of dairy products and herd recording. Thus quality and quantity are involved.

Let us deal first with quality.

Despite the big advances made in farm and factory equipment, official gradings of Choice grade Queensland butter during the past three years show that there has been a retrogression in quality. In a world where progress is evident everywhere, this cannot be regarded with complacency; it must, in fact, be regarded seriously.

Markets can only be captured and held if the quality offered is better than one's competitors; sales promotion campaigns can only succeed if corresponding attention is given to the quality of the products being sold.

The percentages of butter officially graded as Choice quality during the last three years were 29·81, 36·79 and 38·21 respectively, whereas the potential for Queensland is very much higher than this. Possibly 70 per cent. is not too high a figure to anticipate. There is thus a gap of 30 to 40 per cent. which has to be bridged; it can be bridged if farmers desire that it should be.

Let it not be said that our subtropical climate will not permit better results. Much higher percentages of Choice grade butter than at present have been obtained in years gone by and can, with little extra effort, be obtained again. A good standard of hygiene regularly maintained, together with efficient cooling of milk and cream, can bring this about.

Officers of the Division of Dairying are well trained and equipped to assist the farmer in improving his grades and are ready and eager to put their shoulders to the wheel with individual farmers or in any organised quality drive.

Senator B. W. Bignar of the U.S.A. recently predicted that, because of America's rapidly increasing population and its rapidly dwindling farm surpluses, the stage would eventually be reached when it would have to import primary produce from other countries. He said that Australia and New Zealand would be in a favourable position to meet American demands if the Australian primary producer made for development over the next few years. The Senator stated that there was a strong opinion in America that imports from Australia would be well received in that country.

Now is the time, therefore, to put our house in order against the time when opportunity knocks at the door. If there is a real and earnest desire on the part of the dairying industry for its products to excel, and the co-operation of the Department is sought to assist in this direction, all officers would gladly welcome the opportunity to assist in such a forward move and it is safe to say that such collaboration would undoubtedly bring encouraging results in a relatively short space of time.

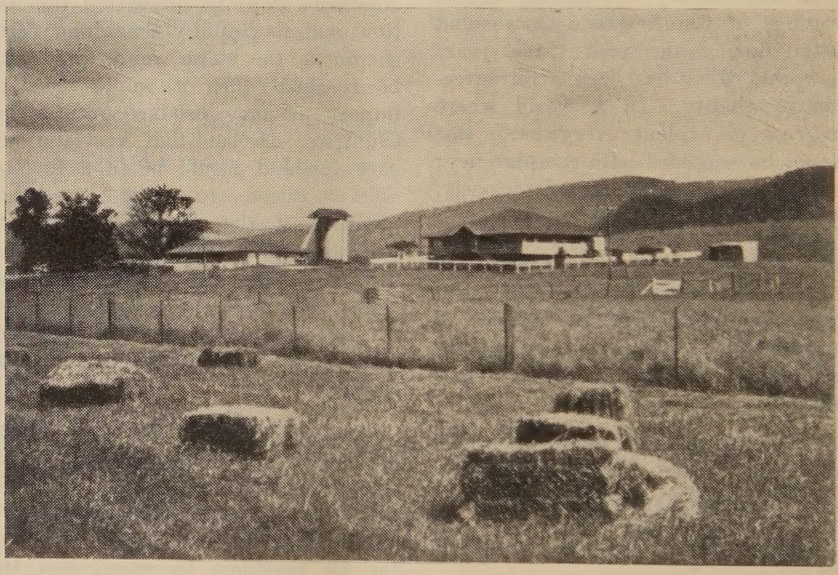
One important gap has now been referred to—quality. Let us, then, consider the other—quantity.

At a time when industry leaders are emphasising the fact that the answer to falling prices lies in volume of production, it is well to consider how increased volume can be

obtained. Herd recording data reveal that a very big loss in production is taking place every year. In Queensland the average length of lactation of all recorded cows is only 229 days. However, 18 per cent. of recorded cows milked for 300 days and each of these produced an amount of butterfat valued at £12 more than those with the average just mentioned. This represents the gap in quantity—a gap which can be gradually closed.

Officers of this Department possess the training and experience to assist the farmer in closing both these gaps and they are anxious and eager to help in every way possible.

The short-term objective of increasing the percentages of the best quality butter and cheese is definitely attainable. Here is an achievement of which the industry could justifiably be proud. The long-term project of increasing production



Fodder Conservation Will Help to Fill the Gap in Production.

An inadequate nutritional standard is the main factor in causing short lactations and this, therefore, is the biggest problem to tackle. A suggested 4-point programme to be pursued would comprise the planting of improved pastures, the adoption of better pasture management, the conservation of more and better fodder, and the adoption of seasonal calving.

by extending lactations could, on present values, earn another £12,000,000 a year for the dairyfarmers of Queensland.

By bending their energies towards them and by working together, the industry and the Department could eventually reach both objectives, thus assuring security and comfort, which is the aim of all farmers.

Standing Timber to Sown Pasture

By N. F. FOX, Agrostologist.

Coastal cattle country is taking on the "New Look". On the property of Mr. P. A. Elliot at Moolboolaman, near Gin Gin, the standing timber has been cleared. Flourishing pastures have now replaced spear grass and suckers.

In this country, timber regrowth is difficult and costly to control. The never-ending job with axe, grubber and poison goes on year after year. There is no future in it. For a short time after clearing, the native pasture grows with renewed vigour but the persistent suckers appear again and restrict grass growth.

Native grasses have other disadvantages. They grow quickly during the summer months and have good feed value but they soon lose this value as they brown off in the autumn. Stock then lose weight until new growth starts with the spring. This seasonal setback prevents the grazier from marketing the young beef the modern housewife demands.

Three years ago Mr. Elliot examined his position. Moolboolaman was stocked to safe capacity. Costs of

Plate 1.

Scrobic and Phasey Bean on a Brown Loam on Moolboolaman, December, 1956. This pasture was sown in January, 1956, and was heavily grazed during the winter and spring.

running the property were increasing at an alarming rate. Prices for the type of beef he could market might not rise. On the other hand, they might easily fall.

The solution was more beef per acre—and the type of beef the market required. Native pasture could not produce it. Crops or sown pastures would! Could fodder crops and sown pastures be grown on Moolboolaman? Previous attempts at agriculture on the forest soils of the district had not been very successful but Mr. Elliot was determined to try.

A bulldozer was purchased and land clearing commenced. Regrowth was pushed over and stacked for burning. A ripper was used to pull sucker butts and roots to the surface.

Clearing has continued. The dozer and firestick have been kept at work. Cattle camps and shelter belts have been left. They are very useful in sown pasture paddocks.

This is the type of job which can be done at odd hours and when stock work is slack.

The Good Earth.

There are two soil types at Moolboolaman—a brown loam and a grey fine sand.

The brown loam grows ironbarks, blue-gums and bloodwoods or a dense stand of spear grass.

The grey fine sand overlies the granite rocks of the district. This fine sand occurs in isolated areas on the property. It is a poor soil where mahogany makes dense regrowth and the native pastures have a low carrying capacity.

If the land is worth holding, both soil types have to be used. It is possible by management to raise the fertility, even in the poorer soils.

Cowpeas and Cattle.

Cowpeas will grow in the district. Their yield is improved if superphosphate is applied at planting time. The variety Poona provides excellent grazing in the summer months and will fatten two bullocks to the acre. Vegetable matter, dung and urine are returned to the soil and aid in building fertility.

At Moolboolaman, after two crops of cowpeas had been grazed off, the soil was improved to such an extent that for the first time a good crop of oats could be grown.

Cowpeas planted in September will top off bullocks for sale in December-January, when prices are usually attractive.

Cowpeas fatten cattle, improve the soil and assist in controlling suckers that missed the early ripping.

A Pasture Legume is Vital!

Cowpeas are annual crop legumes but crop fattening is only a part of the answer to the problem that had to be solved. What *pasture legumes* will grow in these soils? The legume is all-important. Without it, it is unlikely that the more nutritious sown grasses will survive. They will die out and native grasses will again take their place.

The better known legumes (lucerne, clovers, and trefoils) would not grow unless very large quantities of fertilizer were used. Other legumes had to be tested.

A wide variety of both legumes and grasses were sown in trial plots on each soil type at Moolboolaman, with promising results.

Pastures for the Brown Soils.

Phasey bean (*Phaseolus lathyroides*) was the best legume for the brown soils. It combined well with scrobic grass. When superphosphate was added, the growth of both plants improved.

Land was prepared for planting during the spring and early summer. Four pounds of scrobic seed and a quarter of a pound of phasey bean to the acre were planted in January. The strike was excellent and grazing commenced in April. The bullocks were sold in August. Careful management will increase soil fertility and the quality of the pasture will improve.

Scrobic and phasey bean is a suitable pasture mixture on the brown soils.

Those Poor Sandy Soils.

We knew very little about the use of tropical legumes in this subtropical area. Would they persist? Did they nodulate effectively and raise soil fertility? Would stock eat them? Which was the best?

The tropical legumes stylo, Townsville lucerne, centro and desmodium grew well in the plots on the sandy soil but phasey bean did not survive.

Green panic and molasses grass grew well in the plots and seemed the most likely grasses to use.

A paddock was prepared and sown to a mixture of green panic and molasses grass with very small amounts of each of the tropical legumes. Very little seed of these legumes was available at that time and only Townsville lucerne seed was produced commercially.

Grass growth was poor. The plants were yellow and spindly. Weeds grew in the pasture. Plant foods, particularly nitrogen, were not adequate.

This pasture would not survive unless steps were taken to correct the trouble.

In the following spring an adjacent area was planted to cowpea. Stock grazed the crop together with the sown pasture. In this way fertility was transferred in dung and urine

Plate 2.

Green Panic and Molasses Grass on Sandy Soils on Moolboolaman, December, 1956. Planted in February, 1955, this pasture was grazed during the winter and spring of 1956.

from the crop to the pasture. After a time grass growth improved. Plants took on a more healthy appearance.

Tropical legumes are increasing and may eventually supply the nitrogen the grasses require. In the meantime, the pasture can be used in conjunction with the annual cowpea crops.

Thus these poor sandy soils have been put to profitable use and with the perennial pastures which have been established they have been permanently improved.

This Story has no Ending.

A relatively small area of sown pasture may be of immense significance on even fair-sized properties. It may mean the difference between a loss and a profit for the year.

Sown pastures have come to stay. They will improve as the years progress.

The scientist and the man on the land working together will learn more about soil fertility and will find more effective legumes and better methods of managing pastures.

The problem that confronted Mr. Elliot at Moolboolaman may also be yours. It can be solved.

CEMENT-COATED BAGS.

Many enquiries are received by the Department from farmers and others wishing to coat bags and hessian for use as walls and roofs for small buildings.

The materials required are:—

Cement	12 lb.
Salt	1 lb.
Lime	2 lb.
Alum	½ lb.
Bluestone	1¼ gallons.

Sieve the salt and lime through a fine mesh sieve to break up lumps and remove any pieces of rock. Add the water slowly, keeping the mixture stirred. Then add the cement and stir thoroughly during the process. The alum and half the bluestone are finally added, and the whole mixture well stirred.

Take the remaining bluestone and dissolve it in 1¼ gallons of fresh water. With this solution, thoroughly wet the sacking, using a whitewash brush. The mixture should then be quickly applied to the outside, then the inside, and finally to the outside again before the first coat has dried.

Sheds so treated are quite waterproof, and the bluestone greatly lengthens the life of the sacking. Moreover, as the sacking shrinks with the dressing, it assumes quite an attractive appearance.

To estimate how much of the materials is required, wet the sacking thoroughly with fresh water after it has been placed in position. For every 1¼ gallons used the quantities listed above will be required.

Sixty Years Ago

The Brisbane Exhibition of 1897.

The "Queensland Agricultural Journal" for August 1897 contains a description of the exhibits of the Department of Agriculture in the Queensland International Exhibition at Bowen Park.

It is recorded that one display contained all the paraphernalia of the Queensland Travelling Dairy, consisting of a "Sharple's Russian" steam turbine cream separator with a capacity of 65 gallons, a "Læval" steam turbine cream separator (capacity 95 gallons), a "Victoria" cream separator, a Babcock milk and cream tester, a "Laval" pasteuriser with a capacity of 400 gallons, and a "Laval" milk and cream cooler of the same capacity.

The Lockyer Agricultural and Industrial Society's display, in charge of the Agriculture Department, consisted of a trophy of miniature bales of oaten, wheaten and lucerne hay, and of another composed of maize in the cob, millet, sorghum, imphee, Cape barley, *Setaria germanica,* Kaffir corn, oats, lucerne seed, and Allora spring wheat.

Of the display by the Eastern Downs Society, Warwick, it is noted—"Twelve named varieties of wheat, rye, oats and pearl barley in sample bottles, and also in sacks in bulk, are shown. Flour, bran and pollard, the products of the Warwick flour-mill, are not wanting; neither is the ubiquitous maize wanting. A fine trophy of Mr. Jacob Kirchner's wines from his celebrated Assmanshausen Vineyard is conspicuous for its well got up samples. Here also may be seen honey in tins and bottles, together with beeswax, samples of coal, limestones and marbles, tobacco leaf from Killarney, and a fine collection of photographs. The Warwick exhibit would be incomplete without the presence of the fine products of the Yangan Cheese Factory."

Mr. H. L. Jones, of Melbonum Apiary, Redbank, showed a collection of instruments and machinery used by apiculturists. Among the exhibits was a collection of books dating back to 1691.

The Cairns Chamber of Commerce showed coffee trees in full bearing, growing rice, coconuts, sugar-cane, pines, ginger, and birdseye chilies.

Opening of Gatton College.

The official opening of the Gatton Agricultural College took place on 9th July, 1897. Professor Shelton, in welcoming the guests, stated that the three dormitories provided accommodation for 60 students and bachelor teachers. The other buildings comprised the main College building and a dining hall, stables, cowsheds, and a silo.

In officially opening the College, the Governor (Lord Lamington) remarked that Gatton was the first college in Queensland, "and very rightly the inauguration of the first college in Queensland should be that connected with agriculture, upon which this country is bound to look in the future as its great mainstay and most productive industry." Lord Lamington went on to say: "In these days, when we seek world-wide markets, success in competition depends upon two primary factors: One is that your goods should be of the first quality; and another, that they should be produced at the lowest possible cost. These are the two necessary factors in regard to competition when you seek it outside of your own country."

VALUE OF OUR PRIMARY PRODUCTS.

The total value of exports from Queensland during the year 1955-56 was £242,733,483. It is interesting to note the very high proportion of this amount that was contributed directly by the primary industries, and also the high value of exported processed primary products.

Total exports overseas and to other Australian States, as recorded by the Queensland Government Statistician, are given hereunder for various commodities.

	£
Foodstuffs of Animal Origin.	
Beef and veal—fresh, or preserved by cold process	19,780,808
Mutton and lamb—fresh, or preserved by cold process	18,724
Pork—fresh, or preserved by cold process	367,337
Other meat, poultry, game, and soup—fresh, or preserved by cold process	1,604,772
Bacon and hams	891,134
Meat, poultry, game, and soup—preserved in tins or airtight vessels	9,457,640
Sausage casings	111,535
Butter	11,608,099
Cheese	1,058,565
Eggs in shell	139,636
Eggs not in shell	134,626
Honey	212,660
Other foodstuffs of animal origin	1,347,904
Foodstuffs of Vegetable Origin.	
Wheat	3,625,217
Maize	210,050
Millet and panicum	544,616
Sorghum	451,029
Other grains unprepared or simply prepared	1,264,325
Flour, wheaten	1,249,278
Flour, other	3,019
Pumpkins and marrows, fresh	549,080
Tomatoes, fresh	653,319
Beans, fresh	757,762
Other fresh vegetables	972,237
Bananas, fresh	93,177
Pineapples, fresh	571,918
Citrus, fresh	126,282
Other fresh fruit	552,630
Fruits, dried or evaporated	24,398
Pineapples, preserved in liquid or pulped	4,262,340
Other fruits, preserved in liquid or pulped	1,036,877
Peanuts, including peanut paste	1,149,479
Sugar, raw or refined	45,678,777
Other foodstuffs of vegetable origin, including food for animals, and non-alcoholic beverages	2,038,811
Tobacco.	
Tobacco, unmanufactured	1,181,140
Tobacco manufactured, cigarettes and cigars	509,213
Live Animals.	
Cattle	11,735,021
Pigs	968,329
Sheep	1,044,114
Other live animals	46,344
Animal Substances Not Foodstuffs.	
Furred skins	106,472
Cattle hides and calf skins	1,837,278
Sheep skins and lamb skins	531,871
Wool, greasy	44,850,473
Wool, scoured	4,487,291
Other animal substances (mainly unmanufactured)	1,143,155
Vegetable Substances and Fibres.	
Sunflower seed, linseed, other oilseeds and oil nuts	672,486
Cotton lint	252,960
Oils, Fats and Waxes.	
Edible animal oils and fats	1,061,165
Tallow	1,150,834
Other oils, fats and waxes	1,326,617

Preparing Ginger "Seed" for Planting

By E. L. HASTIE, Adviser in Horticulture.

Ginger "seed" is expensive and it is necessary to use planting material to the best advantage. Losses from bad handling, poor storage and disease must therefore be kept to a minimum.

The areas retained for "seed" can be dug up in July or August when the leaves of the ginger plants have died down. The rhizomes will then be well mature, with more than sufficient food reserves—principally starch—to promote strong and vigorous growth when the crop is planted in spring.

The "seed" plot should be carefully dug with a hand-fork to avoid damage to the rhizomes. The whole plant, including the original "seed" piece, may be lifted or the rhizome may be severed with a sharp knife from the "seed" piece, which is then left in the ground to shoot again in the spring and provide a ratoon crop.

Preparation for Storage.

After the plant has been lifted the withered leaves and roots are broken off close to the rhizome and any soil or sawdust adhering to it is removed. Rhizomes with soft or discoloured spots and even those showing cracks

Plate 1.

Mulched Ginger Crop on the North Coast. Note drainage channels which take away excess surface water.

or other types of injury should be sorted out from the sound material which alone is suitable for planting. The latter is then placed under cover; deterioration may occur if it is left exposed for any length of time to sun or dry winds.

Planting material will not be required until spring. In the meantime the rhizomes should be broken or cut into "seed" pieces about 2 oz. in weight and stored in crates. If the rhizomes are not reduced to "seed" pieces before storage, one or two buds tend to develop prematurely, and when the ginger is broken up before planting some pieces will be well "shot" and some will be backward. Preparing the "seed" pieces when the crop is lifted allows the broken or cut surfaces to callous over satisfactorily. It also saves time in spring when planting operations begin and the labour on the farm is fully occupied.

Breaking the rhizome into pieces is quick and easy but requires some care if excessive injury to the tissues is to be avoided. In addition, it is difficult to obtain uniformity in "seed" size by breaking the rhizomes, for they will only "snap" at the narrow joints. Cutting the rhizomes into "seed" pieces with a sharp knife does a better job; "seed" size is uniform and the cut surfaces callous quickly. However, if any rots are present and precautions are not taken to sterilize the knife, disease organisms transmitted from sound to healthy ginger may later affect the field crop.

Size of Seed Pieces.

"Seed" pieces weighing 2 oz. are a good average size for commercial plantings, for if the initial shoot is damaged before planting, they have dormant eyes from which new shoots can develop.

"Seed" pieces weighing 1 oz. make good planting material when the crop is established in favourable weather, mulched and irrigated immediately. However, they have only a limited supply of reserve foods and the "strike" may not be satisfactory if the crop encounters adverse conditions after planting. Should the first-formed shoots be damaged by sunburn, for example, the plants may not be able to produce new shoots in sufficient quantity to re-establish a full stand.

The smaller "seed" pieces are economical of planting material and usually give a greater growth increment for the season than larger sizes. The yield per acre, however, is not necessarily greater.

Storage.

Once the rhizomes have been broken into "seed" pieces, they should be placed loosely in well-ventilated crates. Tight packing is likely to cause bruising and poor ventilation sometimes leads to the accumulation of excess moisture, which tends to cause rotting. However, the crates should be protected from dry westerly winds so that the stored ginger does not dry out before planting. Shrivelled "seed" will shoot but the shoots are usually slow to develop and are frequently weak. Furthermore, shrivelled "seed" seems more liable to rot when established in the field.

Early Planting.

In general, early-planted ginger crops have a longer growing period and yield better than late-planted crops.

Normally ginger begins to shoot in late September but earlier shooting can be induced by forcing the development of the shoots. This is done by placing the "seed" pieces in raised beds during August and covering them with sawdust. The beds should be warm, well sheltered from cold or dry winds, and adjacent to watering facilities. The dimensions of the beds are variable and depend on the preference of the individual grower.

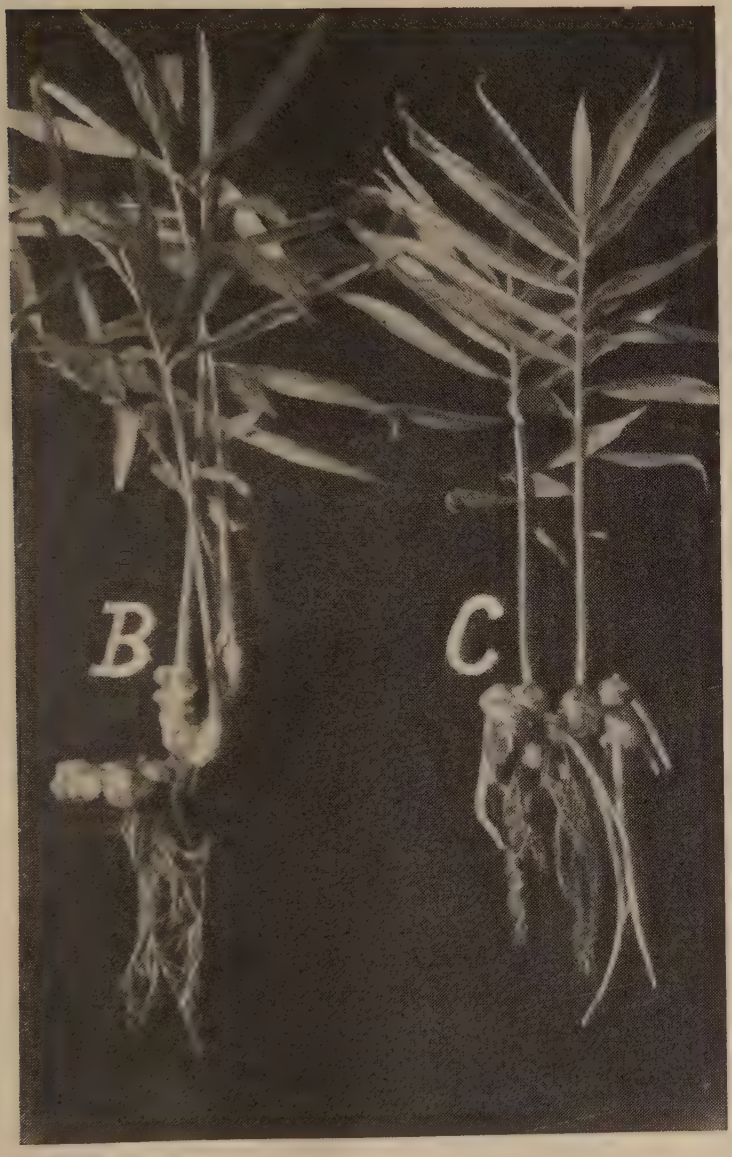


Plate 2.

Ginger Plant Removed from the Soil. The root system is relatively small and shallow.

Plate 3.

Ginger "Seed" Pieces Ready for Planting in the Field. All are about 2 oz. in weight and some eyes have "shot."

The "seed" pieces may be placed flat on the ground in single or double layers, but it is a better practice to arrange the material in a single layer with each piece of ginger in an upright position. Temperature and moisture in the bed are then more or less uniform and shoot development will be fairly regular. After the "seed" pieces have been placed in position, the beds are covered with about three inches of sawdust, which is kept moist but not wet; excessive watering may induce rotting of the "seed".

The shoots should not be too far forward at the time of planting. The first-formed shoot is the most sturdy and vigorous, and if it is broken or damaged, some time elapses before another bud bursts and a second shoot appears above ground. The length of the growing period is consequently reduced and yields from the crop may fall below normal.

When planting begins, the "seed" pieces are lifted carefully from the beds, placed in containers and carried to the field. The containers should be covered to prevent the young and delicate shoots from drying out or scorching.

Early-planted crops normally run less risk of damage from sunburn than late-planted crops. However, high temperatures are liable to occur during the middle of the day at any time in spring and early summer and no planting time is really safe. Nevertheless, the risk of serious damage can be reduced by planting small areas at short intervals over a period of several weeks. Each area will then be at a different stage of growth when hot weather does occur and will differ in its susceptibility to sunburn injury. The risk of serious losses under these conditions is not great.

Is Closer Planting of Bananas Practicable?

By J. McG. WILLS, Senior Adviser in Horticulture.

In any banana plantation, several factors have a bearing on its success or failure as a commercial venture. Two of the more important of these are the variety grown and plant spacings.

Prior to 1930, methods of plantation management were somewhat primitive. Fertilizers were seldom used, desuckering was haphazard and no attempt to control the time of bunching was made. At that time, most of the more accessible "scrub" land had been worked out and new plantations had, perforce, to be established either on replant land or on virgin land of relatively low fertility.

To ensure continuity of production on such land, radical changes in cultural practices were essential. Mons Mari, a semi-tall variety, began to replace Cavendish, which was then the principal banana grown in Queensland. It quickly gained favour in many districts because of its ability to produce large bunches of high-grade fruit on the less fertile soils and also at altitudes higher than those which were previously considered safe for the crop. At the same time, greater attention was given to the use of fertilizers, systematic desuckering and weed control, all of which increase the profitable life of a plantation considerably and pay excellent dividends.

Plant Spacing.

The best planting distance for both the Cavendish and the Mons Mari varieties under modern systems of plantation management is still a debatable point. Under dry-farming conditions, 90 sq. ft. (equivalent to about 500 plants per acre) is probably the safe minimum area per plant. Nevertheless, some commercial growers favour a higher plant population per acre as a method of ensuring quick returns.

Close spacing is of little value if greater production from the plant crop is achieved at the expense of the ratoon crops, and in any case it could be commercially practicable only under an efficient system of management. The most attractive of the possible procedures is perhaps to retain the present row spacing of 9 ft. or 10 ft. and plant 5 ft. apart in the row. This allows for the removal of every second plant in the row once the plant crop has been harvested. After the first cut, the plantation would then be maintained at an orthodox spacing with about 90 sq. ft. per plant and handled on the one bunch—one follower system. Attempts to increase production from the plant crop by close spacing are not without risk, however, and growers should carefully consider the advantages and disadvantages of this practice.

Advantages of Close Spacing.

Provided the season is reasonably good, close planting seems to have little ill effect on the plant crop, when the plantation is regularly fertilized and receives proper care and attention. Weed growth is largely suppressed by the heavy canopy of banana leaves, and, as a result, costs of spraying and chipping are substantially reduced.

Close spacing means more bunches per acre (about 900 instead of 500 as at standard spacings) in the plant

Plate 1.

Banana Plantation on the South Coast. Virgin land of this kind which can be cleared and planted to bananas is becoming scarce. On replant and less fertile soils efficient management is essential.

crop and, presumably, better returns. These should more than cover the additional expense incurred in purchasing fertilizer and planting material. The cost of planting material is, however, partly offset by the supplies which become available for sale or use after the plant crop has been harvested and alternate plants in the row are removed.

Two incidental advantages of close spacing are the reduction in the loss of soil moisture by evaporation from the shaded surface of the soil, where the temperature remains comparatively low; and the added protection against soil erosion provided by the dense stand of the plants during the wet season.

Disadvantages of Close Planting.

Increasing the number of banana plants per acre involves a corresponding increase in the amounts of soil moisture and nutrients needed by the crop. During a protracted dry spell, such as frequently occurs in spring and early summer, supplies of both may be less than are required for normal growth and development. The effects can be very serious and show up in reduced bunch size, delayed maturity and inferior fruit quality.

As compared with a normal stand of plants, sucker growth is less vigorous in close-spaced plantations and followers set for the first ratoon crop take a longer time to produce a bunch. The interval between the plant crop and the first ratoon crop is therefore greater.

The difficulties associated with crop control (that is, the production of winter and spring fruit) are also accentuated by close planting. Setting "followers" for the production of a ratoon crop at any particular period presumes a knowledge of sucker growth and development. The pattern of their behaviour is well estab-

Plate 2.

Mons Mari Bananas Grown at a 10 ft. x 9 ft. Spacing. This is a common spacing in commercial plantations.

Plate 3.

Mons Mari Bananas Grown at a 12 ft. x 4 ft. Spacing. The plants grow tall, sucker growth is slow and heavy production of good quality fruit can be expected only in good seasons or in plantations with irrigation facilities.

lished in plantations at normal spacings but comparable information is not yet available for close plantings.

Increased shade is inescapable in closely spaced bananas and this would probably be conducive to a higher incidence of leaf spot and other fungous diseases which affect bunch size and fruit quality. Unless control measures for these diseases are efficiently applied, losses could assume serious proportions.

There is one other point worth noting. Plants infected with bunchy top can be easily overlooked by growers and inspectors during patrols in dense stands of bananas where the range of vision is restricted. This could have serious consequences when conditions are favourable for the spread of the disease.

Conclusion.

It is doubtful if plant spacings of less than 9 ft. x 9 ft. are a practicable proposition in non-irrigated plantations. At best, they will increase returns from the plant crop and then only if seasonal conditions are good and the grower handles the plantation with considerable skill.

Growers would be wise, therefore, to restrict close plantings to small areas where they can get first-hand experience on plant behaviour under these conditions and a better appreciation of the associated problems which arise in plantation management.

A "Carpenter" with Tubular Steel

By K. FITZGERALD and J. ARMITT, Dairy Officers, Ipswich.

Are you a good carpenter, or can you be classed as a good handyman? In either case, if you intend building modern dairy premises, you yourself can erect comparatively cheap dairy buildings with tubular steel.

The advent of tubular steel construction into primary industry in recent years has enabled many farmers to erect modern dairy buildings and yet keep erection costs low. While the conventional wooden buildings in many cases require employment of builders and skilled labour, these ready-to-erect or prefabricated buildings allow a farmer to erect his own buildings without excessive expenditure.

Not only are these buildings economical to build, but, being of sturdy tubular steel, they are permanent buildings, free from the problem of white ants and other pest insects that exists with wholly wooden buildings. The danger from these unwanted lodgers is kept to a minimum when steel premises are erected.

To-day in Queensland there are several firms producing these buildings. They can be purchased in any

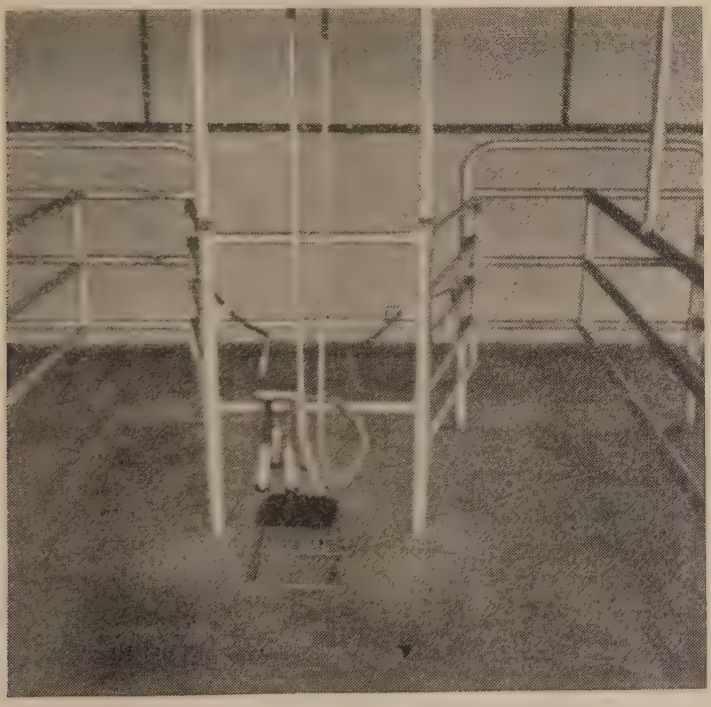


Plate 1.
Typical Tubular Steel Bails.

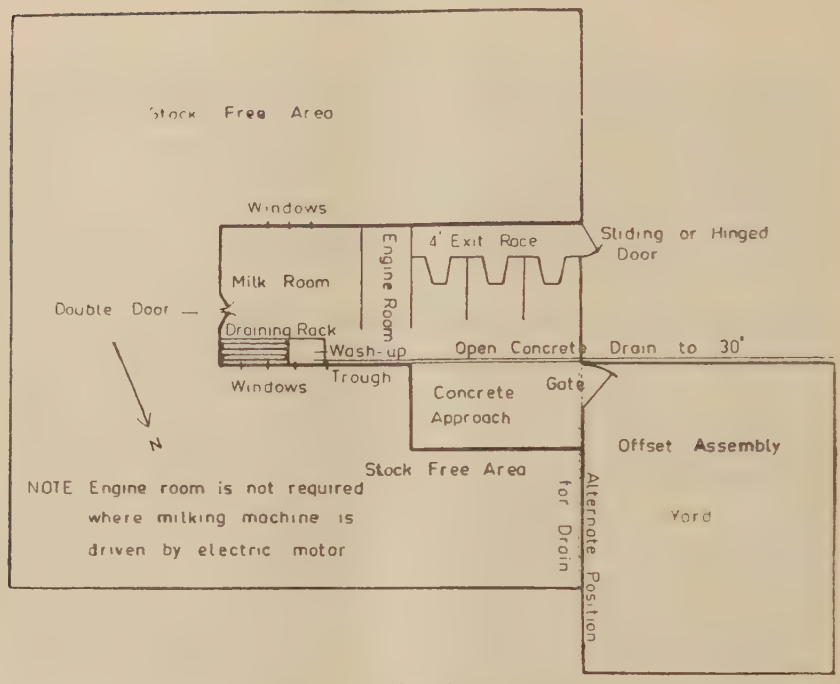


Plate 2.

Plan of Combined Dairy Building.

size from two units upwards, or the bail sections can be purchased separately and used in conjunction with any wooden building at present in use.

The building is supplied in sections. By carefully following the instructions on the detailed plans it can be constructed with little difficulty. The exact position of each section is shown on the plan.

Construction and Layout.

All walls are placed on a dwarf concrete wall which raises the wall proper off the ground. The wall should be at least 6 in. high, but is normally constructed to a height of 24 in. The wall is a very effective provision against water rot of timber, and it makes the buildings easy to clean.

The concrete floor is laid to provide a fall from the back or exit race area to the front or concrete approach area. The floor of the milk room drains into the bails, and this ensures that all drainage leaves the buildings by a common drain. In several sheds portion of the bails themselves are suspended, thus eliminating some posts in the ground. This, coupled with the one-way drainage, permits easy cleaning and sweeping of the whole building.

Plate 1 shows one of the types of tubular steel bails. In this unit the cow is held in the bail by a breeching chain and leaves the bail through a side gate.

The layout and design of these buildings incorporate all the recent improvements in building construction. As with the modern home, the accent is on labour-saving, combining ease of work and pleasant working conditions. A typical layout is shown in Plate 2.

The cows enter the shed from a yard at one end and leave the building by a 4 ft. exit race which is incor-

porated within the building. Plate 3 shows the 4 ft. exit race taken from the exit door and looking up the race. This helps to minimise dust, one of the deadliest enemies of milk and cream. Dust contamination from churned up yards is minimised and dust is kept as far as possible from the milk room.

It can be noticed that ample space is provided in the milk room and ample provision is made for windows or louvres. As milk is cooled and stored in this room, it is essential to keep conditions as cool as possible.

This building's pleasant appointments and ease of cleaning eliminate much of the drudgery associated with twice-a-day milking.

The modern styling of tubular steel buildings makes them attractive to the eye and a real asset on the farm.

Several Designs.

A number of these buildings have been built in the Ipswich area and some are shown in Plates 4, 5 and 6. One is walled with corrugated iron. Iron walls can present an attractive appearance and this particular building is quite cool. It is a matter of preference whether iron or timber is used for the walls, but if weatherboards or chamfer-boards are used, as with the building in Plate 5, the cost of material will be slightly higher than for iron.

Would you like to milk in bails similar to those in Plate 6? Here you have ease of cleanliness, ease of operation and low maintenance costs, which only tubular steel buildings provide. These advantages, coupled with the bright appearance of the bails, make that twice-a-day milking more attractive to you and your family.

Plate 3.
End View of 4 ft. Exit Race.

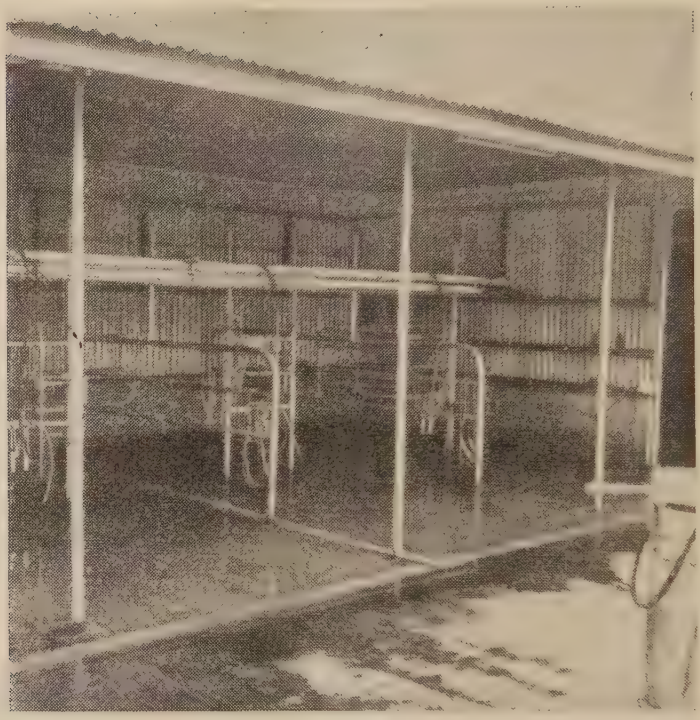


Plate 4.

Tubular Steel Dairy Building with Corrugated Iron Roof and Walls.

Costs.

The 4-unit shed shown in Plate 4 was built for an overall cost of £655. Detailed costs of the erection of this building are:—

	£	s.	d.
Building frame	126	0	0
4-unit crush-type bails	108	10	0
Covering iron and nails (roof and walls) ..	95	4	0
Cement	25	0	0
Reinforcing ($\frac{5}{16}$-in. mesh; $\frac{1}{2}$-in. rod) ..	49	18	8
Timber	49	14	9
Labour and concreting (contractor)	201	8	0
Total ..	£655	15	5

(30 cu. yd. of mixed sand and gravel were supplied by the owner.)

Concreting was the only part of the work not carried out by the owner. The cost of the concreting work was high, but as this is a job which can be done satisfactorily by many farmers, a similar building could be erected for £450. This is a reasonable cost today.

The other building (Plate 5), walled with chamfer-boards, is a 3-unit shed, fully lined and ceiled throughout. It was constructed by a builder for £700. This shed is equipped with a crush-type tubular steel bails and possesses a milk room 20 ft. x 18 ft. in size. Other features include a good area of ventilation, nicely painted exterior and a general tidy appearance.

Plate 5.
View of Chamfer-board Milk Room.

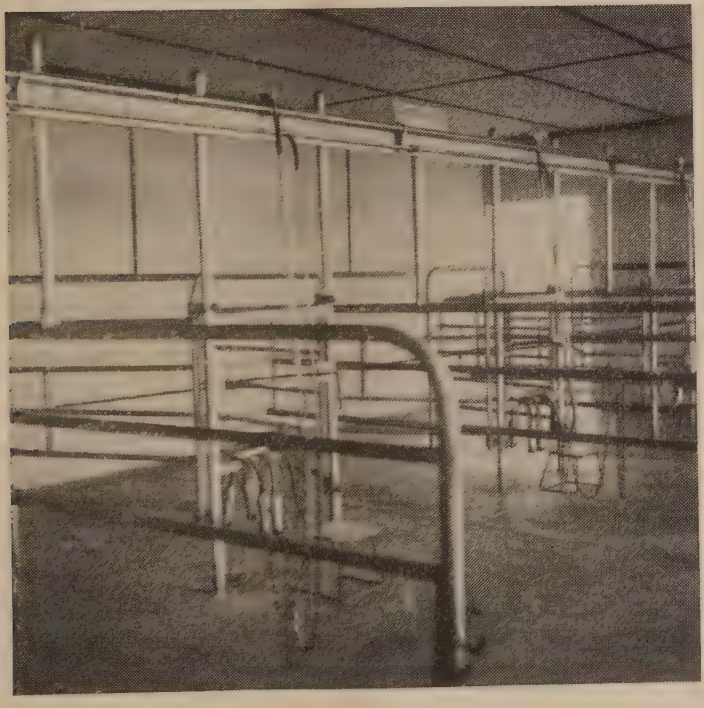


Plate 6.
General View of Tubular Steel Bails.

If you are your own carpenter and if there is good timber growing on your property, you may prefer to construct a wooden building. However, if you are not your own carpenter and would have to employ a builder to erect new premises, then prefabricated steel units are worthy of serious consideration.

As with wooden buildings, a regular expenditure for painting is still necessary with tubular steel. While wood is susceptible to rot, metal surfaces are subject to rust and corrosion unless adequately painted, and all care should be taken to protect these metal surfaces.

Other Uses.

The use of tubular steel does not stop at the construction of the shed and bails. Equipment such as vat stands, draining racks and can racks can also be made of tubular steel. These types of fittings are of great assistance in the orderly storage of utensils and assist in adequate cleaning of shed equipment.

Cattle feeding stalls, calf pens, haysheds and implement sheds are other types of farm buildings which can be readily constructed from tubular steel.

The construction and layout of the modern dairy building in tropical Queensland requires serious consideration and there has been a marked improvement in this respect in recent years. Buildings of tubular steel have certainly proved their worth and found their place on the farm. If you are going to build shortly, think this over, weigh the advantages and disadvantages, and compare costs. This could supply you with the answer to your building problem.

IRRIGATION IN AUSTRALIA.

The following table sets out particulars of the acreage irrigated in the various States of Australia in 1955-56.

Crop.	*N.S.W.*	*Vic.*	*Qld.*	*S.A.*	*W.A.*	*Tas.*	*A.C.T.*	*N.T.*	*Aust.*
Rice ..	41,837	..	..	..	..	..	..	..	41,837
Vegetables	16,658	16,330	19,928	10,538	6,880	1,125	146	55	71,380
Orchards ..	18,142	35,452	3,671	16,248	4,768	605	8	74	164,363
Vineyards ..	12,960	45,518		26,453	463	..	..	..	
Sugar Cane	(a)	..	58,762	..	..	..	..	..	58,762
Hops ..	..	(a)	..	..	..	1,248	..	..	1,248
Cotton ..	..	..	685	..	..	..	..	..	685
Other Crops	70,043	30,891	29,511	3,548	1,725	1,231	420	96	137,465
Pastures ..	219,971	506,143	23,562	14,380	23,328	7,290	200	..	794,874
Total ..	379,611	634,334	136,019	70,987	37,164	11,499	774	225	1,270,613

(a) Included with other crops.

New Facts and Reminders About Mastitis

By S. G. KNOTT, Veterinary Officer.

You can control mastitis in a herd best by adopting a programme that focuses attention upon accurate diagnosis, proper hygiene thoroughly carried out, correct management practices, and early treatment.

Penicillin is still giving good results, but newer treatments which have been evolved must be resorted to occasionally.

Mastitis continues to be one of the greatest problems that the farmer has to battle with. It is also robbing the national economy.

MASTITIS MORE COMMON?

Is mastitis more common than it was previously? The answer is yes.

Originally nature tucked a small udder snugly up between the hindlegs. Here it was out of harm's way. But for centuries we have been trying to breed cows with bigger, better udders, producing more and more milk. This has resulted in an udder exposed to injury and chills.

Mechanisation was then thrust upon cows in the form of milking machines. From this farmers developed a tendency to regard the cow as a mechanical unit in a system and not as an individual.

High-producing, fast-milking cows tend to be more susceptible to mastitis and to the abuses which milking machines allow.

Add all of these facts together and you have the reason why mastitis is more prevalent.

CAN MASTITIS BE ERADICATED?

Most attempts to eradicate mastitis have been aimed at eradicating from dairy herds the commonest bacteria responsible, *Streptococcus agalactiae*. This involves the regular testing of milk samples for the bacteria, the treatment of infected quarters and the disposal of cows resistant to treatment.

Many efforts in this regard have failed in that the bacteria have eventually reappeared, but badly infected herds have been kept clean for many months by this method.

Total eradication of *Streptococcus agalactiae* is possible because the organism only survives in the bovine udder, but this is not possible with other common types of bacteria causing mastitis, such as staphylococci, corynebacteria and *Bacterium coli*.

These organisms can exist and multiply outside the bovine udder, in and around the cow bails. Infection can come from leg ropes, dirty clothes and other implements handled in milking. However, the main source of staphylococci for invasion of the bovine udder is other mammary glands that are shedding these organisms in the milk.

The control of mastitis then revolves around prevention and treatment.

PREVENTION.

Prevention is more important than treatment. Many farmers don't think so, but this is because it consists of

"do's" and "don'ts". Prevention can be divided into cowmanship, and hygiene and machine care. Only the important points will be mentioned here.

Cowmanship.

Do you treat your cows with the care and kindness they require?

It is important that you stimulate your cows to let down immediately before putting the cups on. Adopting a regular routine ensures this.

Hand stripping does increase the percentage of mastitis. There is no need to hand strip if you train your heifers to machine strip.

Don't complain about mastitis ruining your cows if you milk diseased quarters onto the floor—that is asking for trouble.

Keep a check on your cows with a strip cup. The strip cup is ideal for the early detection of mastitis, as the foremilk often contains a high count of bacteria if they are present.

Feed your mastitis milk to the pigs and not the calves, because they suck one another. But most important of all, milk those suspect and affected cows last.

Hygiene and Machine Care.

General cleanliness, good machine care and plenty of boiling water go a long way towards defeating the bacteria which cause mastitis.

Do you follow the recommendations of your local Dairy Officer about cleaning and caring for your machines?

Boil udder cloths daily. Chlorine disinfectants are still very good for udder washing. It is a good idea to have two buckets, one containing clean water and one for disinfectant. Disinfectant solutions contaminated with dirt and organic matter rapidly lose sterilizing power and become a source of infection. When the disinfectant solution becomes at all dirty, renew it. Use a hypochlorite solution containing 3¾ fluid ounces in 2 gallons of warm water.

Quaternary ammonium compounds such as "Zephiran" and "Cetrimide" have recently entered the field as dairy disinfectants. They are used at 1 in 5,000 solution. A still newer preparation which shows promising results is "Hibitane".

If you are experiencing a bad outbreak, then you will find it necessary to dip the cups in a chlorine solution between cows. Only dip two at a time, or the air pressure will not let the solution up.

If cup dipping is practised, it is important to dip the cups first in water, to remove any milk residues, before dipping them in the chlorine solution, which should be twice as strong as for machine cleansing. If milk does get into a chlorine solution the resulting compound is not nearly as efficient a disinfectant. Unless this operation is done properly, it is a waste of time.

Detergents are not recommended, as they remove the waxy layer on the teats and cause chapping.

Mastitis is most easily developed by repeatedly exposing cows to small doses of infection. Try to prevent this happening by being careful about your hygiene.

BACTERIA CAUSING MASTITIS.

Streptococcus agalactiae is still the commonest bacterium causing mastitis in our dairy herds. There are other forms of streptococci occasionally found, including *S. dysgalactiae, S. zooepidemicus* and *S. fecalis.*

Staphylococcal mastitis rates second in importance. This type has been brought into greater prominence in recent years by the control which penicillin has exerted over streptococcal mastitis.

Corynebacterium pyogenes causes sporadic cases, particularly in dry cows. Abscess formation is often associated with this bacterium.

Other organisms sometimes associated with mastitis include coliforms, pseudomonads, clostridia and fungi.

SYMPTOMS OF MASTITIS.

For descriptive purposes mastitis may be considered to occur in two forms—acute and chronic. Of course, there are various grades between these.

Acute Mastitis.

This is the form most familiar to the cattle owner.

The affected quarter becomes hot, tense, hard and tender. The milk secretion is largely diminished and may be watery, straw-coloured or blood-tinged and may contain clots.

Affected cows can become visibly sick, show depression and lack of appetite, and run a high temperature. In extreme cases, the cow may die or a quarter may become gangrenous and slough off.

Chronic Mastitis.

This is not so easily recognised, because a balance exists between the infecting organisms and the udder tissue.

Only very small areas of secretory tissue are affected at any one time. As a result, the gland is not swollen and the milk often is apparently normal to the naked eye. Fibrous scar tissue is laid down within the udder and changes occur in the leucocyte count, salt content, milk sugar content and butterfat content.

These changes add up, so that eventually a lot of the secretory tissue becomes replaced with fibrous tissue and the quarter becomes hard and atrophied and milk secretion is therefore diminished. The loss is insidious, but very real.

Chronic cases can flare up into acute or subacute cases according to conditions existing at the time and then subside again.

It must be realised, of course, that there is no clear-cut line of distinction between acute and chronic cases.

TREATMENT OF MASTITIS.

The early forms of treatment consisted of hot fomentations and massage. This still has its place, but has been greatly improved upon by the introduction of the sulphonamides and antibiotics.

Treatment has been streamlined by preparation of the drugs in ointments and water-in-oil emulsions in a collapsible metal tube with a self-contained teat cannula. In spite of these aids to sterility you must wash and disinfect the teat and teat orifice.

Penicillin is still the best all-round drug available to farmers. This is because it is efficient against most bacteria, is non-irritant to the udder tissue and is relatively cheap. There is now a tendency to recommend larger doses such as 100,000 units, at least for the first treatment. The course of treatment is still for three or four days. On no account cease treatment if the quarter appears to clear up after one or two days. Most important of all, treat suspected cases early. Strip the quarter out before inserting the drug and massage it well into the udder.

Other drugs which have come into prominence over the last few years include streptomycin, chlortetracycline, oxytetracycline, achromycin, chloramphenicol, neomycin, bacitracin, polymyxin B and "Hibitane."

Some of the newer drugs occasionally cause udder tissue irritation in individual animals. If it is excessive, change the drug being used.

The reason for the appearance of these drugs is their superiority over penicillin in treating mastitis other than that due to streptococci.

Treatment should extend for 3-4 days, which is more than some manufacturers recommend.

Staphylococcal infections are much more resistant to treatment than streptococcal ones. Even where it can be shown that an antibiotic will kill the germ responsible outside the udder it does not necessarily follow that it will cure the mastitis.

Combinations of antibiotics are often more effective than either acting alone. Because of this, dispensers containing mixtures of drugs are available. The mixtures used are always of drugs which act synergistically—that is, each increases the activity of the other. Examples of this include penicillin and streptomycin, oxytetracycline and polymyxin B, and chloramphenicol and sulphone.

A recent advance consists of administering the oxytocic hormone, pituitrin, after milking the udder out. This is the "let-down" hormone. The dose varies from 10-40 units given by intravenous or intramuscular injection. The quarter is then restripped to remove any further milk and debris, and the drug inserted.

Difficult cases often respond to intramuscular injections of antibiotics, used in conjunction with injections in the udder.

CONCLUSION.

The control of mastitis in a herd is best obtained by adopting a programme that focuses attention upon accurate diagnosis, proper hygiene thoroughly carried out, correct management practices and early treatment.

Penicillin is still giving good results, but newer treatments which have been evolved must be resorted to occasionally.

BAG AND BUSHEL WEIGHTS OF COMMON FODDERS.

Many farmers and graziers are puzzled at times to remember the weight contents of bags of common foodstuffs, also bushel weights.

The tables below record these for easy reference.

Foodstuff.	Weight per Bag (lb.).	Bags to the Ton.
Wheat	175	13
Maize	160	14
Sorghum	156	14
Oats	130	17
Cereal chaff	70–80	28–30 (varies).

Bushel Weights (lb.).—	lb.
Wheat	60
Maize	56
Sorghum	56
Oats	40

Top Recorded Herd in State

By F. J. SLATTER, Dairy Adviser, Pittsworth.

It is no mean feat to turn unproductive land into a first class dairy farm in the short space of nine years. It is all the more creditable when the grade herd of 10 cows produced more butterfat per cow than any other recorded herd in Queensland during the herd recording year 1955-56.

The farm which achieved these results is owned by R. S. and G. C. Postle, Felton road, Pittsworth. The 10 cows averaged 376 lb. of butterfat and the average lactation period was 282 days. The highest producing cow recorded 511 lb. of butterfat in 300 days.

In addition to the grade cows in the herd, 29 purebred Jerseys were milked and were recorded under the Pure Bred scheme. Ten of them averaged 416 lb. of fat in 273 days, while in the same period six junior 2-year-olds averaged 398 lb. of butterfat.

When Mr. and Mrs. Postle took over the property just nine years ago it was only boundary fenced. Since then it has been transformed into a highly developed dairy farm. The 350 acres are now fenced into 11 major paddocks, plus three calf runs and one bull paddock. Two hundred acres of the dark chocolate loam are cultivated and the remaining 150 acres of the well-grassed ridge country are used for grazing.

At first glance it can be seen that the farm has been planned for convenience. All paddocks open out on to a central laneway. The gates of the paddocks have been built so that, when they are opened, they stretch right across the laneway, turning the cows into a particular paddock.

Mr. Postle believes in providing plenty of water for the herd. The farm is equipped with two bores and troughs, and the animals have easy access to water from all paddocks. Water is also available at the milking yard.

Cows Fed Well.

Nearly all the produce grown on the farm is fed back to the cows. The 35 acres of lucerne is cut, baled and stored, the hay being fed back to the cows to provide roughage and extra protein. At present there are at least 80 tons of lucerne and wheaten hay held as a reserve for dry times.

Oats is the main grain crop grown. The oat grain is mixed with some barley and sorghum and is hammer-milled to provide a meal for supplementary feeding. The barley and sorghum are mainly used to assist in crushing.

Dairy cows on this property are well fed. Mr. Postle believes that if a farmer does not feed his herd well all the year he will not reap the benefit of extra production in a good season or maintain reasonable production in a dry one.

Cows are grazed on Sudan grass and Siberian millet in the summer months, and on oats, canary seed and wheat during the cooler weather. An interesting feature about this grazing is that to provide shade on hot days the cows are grazed in the shaded grass paddocks during the day and on the crops at night.

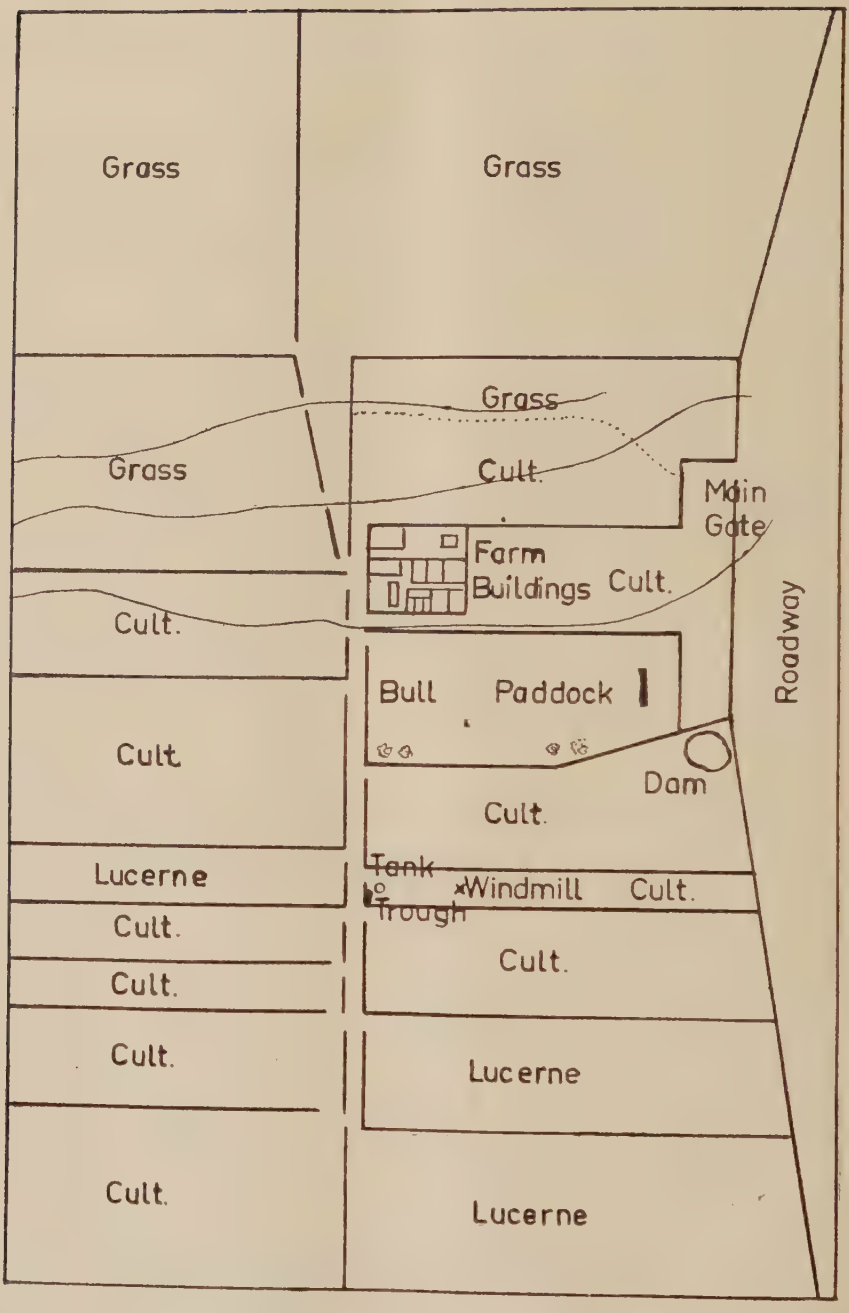


Plate 1.

Layout of the Postle Farm.

Plate 2.
Baled Hay Fodder Reserves.

The herd is fed supplements in the bails at milking time. Fresh cows are fed more than those that have been milking for some months, although Mr. Postle feeds stale cows to keep them in sound physical condition.

Although Mr. Postle does not strip the cows by hand, he finds they can eat their ration while they are being milked.

Under normal conditions, cows are fed at the rate of 3 lb. of crushed grain and 3 lb. of lucerne chaff a day. In addition, bone flour and coarse salt are fed. These are mixed with the grain prior to crushing at the rate of one tablespoon of each to a kerosene tin of grain. While this ration supplies sufficient phosphate to Mr. Postle's herd, in areas where there is a phosphate deficiency an increased ration of bone flour would be necessary.

Herd Management.

The Postle family practices good herd management as an aid to greater production.

A bull paddock is provided. The bull is not allowed to run with the herd at any time and special paddock services are strictly controlled. This makes it easy to regulate calving. Herd mating has been controlled to eliminate calving in the January-March quarter of the year, thereby increasing production by lengthening the lactation period.

During the 1952-53 recording year, the average milking period for the herd was 225 days. This was increased to 282 days for the year 1955-56, an increase of 57 days.

Severe culling has been practised and this has kept the herd comparatively young. Females have been

Plate 3.

"Yarrallaside Golden Lass"—381 lb. Butterfat in 300 Days.

culled for old age and low production, although temperament has also been considered. An animal must be quiet but not timid and have good shed manners to remain in the Postle herd. Replacement heifers are all reared on the farm from high-producing dams.

Through the winter months all milkers are rugged at night. The practice, of course, is to assist the animal to keep warm during the cold Downs winter without using extra energy, energy which could better be used for producing milk.

Breeding Programme.

Over the last few years the main breeding aim has been to change the herd from grade to purebred Jersey. This change is evident from herd recording information. In the recording year 1953-54, 32 cows were tested under the grade scheme and averaged 258 lb. fat in 264 days; during 1955-56, only 10 grade cows were tested, while the number of cows recorded under the Pure Bred Production Recording Scheme increased greatly.

Line breeding is practised by Mr. Postle. The senior sire is "Glenvillian Admiral," and the production results of his progeny indicate his worth as a herd sire. Ten daughters have been recorded under the Pure Bred Production Recording Scheme and they have averaged 7,480 lb. of milk, containing 408 lb. of butterfat. The production of these daughters are listed in Table 1.

TABLE 1.

Details of Production.

No. of Cows.	Age (Years).	Average Milk Yield.	Average Butterfat Yield.
		Lb.	Lb.
3	2	6,731	366
5	3	7,060	393
2	4	9,655	510

Nine of these 10 daughters have qualified for the Advanced Register.

Plate 4.

"Glenvillian Admiral," the Senior Sire in the Postle Herd.

Mr. Postle gives this bull much credit for the improved production of the herd, and he has been in the herd now for six years.

The junior sire is a 3-year-old bull, "Yarrallaside Rodney," who is a son of the senior sire.

Management The Key.

The high productions obtained on this farm are a direct result of the following farm management practices:—

(1) A well-fed and well-watered herd.

(2) The use of a proven bull.

(3) Excellent herd management coupled with controlled breeding.

(4) Continuous herd recording.

(5) Systematic culling based on herd recording results and temperament.

(6) Increased length of lactation due to better feeding and seasonal calving.

(7) A sound calf-rearing programme which provides herd replacements.

From now on the name of R. S. & G. C. Postle will be missing from the top grade herd recording results in Queensland, but only because the herd is now purebred and will in future be recorded under the Pure Bred Production Recording Scheme. The success of these partners fully emphasises the results which can be achieved and the financial benefits to be obtained by adopting a progressive farm management programme.

Herd Recording: Twenty Questions and Answers

By S. E. PEGG, Chief Adviser (Herd Recordings).

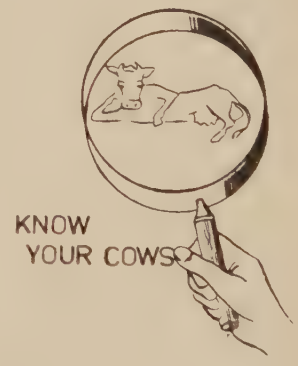
Group Herd Recording has been operating in Queensland since 1948, but there are many farmers who still do not realise how it operates.

In order to outline briefly the working of the scheme, and some of its uses, a list of 20 pertinent questions has been set out together with the answers.

Should these questions and answers not convey the specific information required by any person, he should communicate with his local Departmental officer.

Q.1. What is Herd Recording?

A. Herd Recording is a service provided for the dairy farmer to enable him to obtain accurate information in regard to the quantity and quality of the milk produced by the individual cows in his herd.



Q.2. How is it organised?

A. Herd Recording is operated by the Department of Agriculture and Stock. Dairy farmers wishing to have their herds recorded make application to the local Dairy Officer, who allocates them to a Herd Recording Group. Each Group, which operates in a restricted area, consists of an average of 20 herds.

Q.3. What are the advantages?

A. Herd Recording is essential to the progressive dairy-farmer. It enables him:—

(*a*) To cull low-yielding cows which are unprofitable.

(*b*) To breed from animals known to be good and regular producers.

(*c*) To feed according to yield.

(*d*) To check on various farm practices.

Accurate information in regard to yield is essential for carrying out the above; and this information can only be obtained by Herd Recording.

Q.4. Who does the work?

A. The recording work is carried out by men known as Herd Recorders employed by the Department of Agriculture and Stock and specially trained for the work. A Recorder is allocated to each Herd Recording Group. The work involves the weighing of the milk of the individual cows at the evening and morning milkings once a month and the testing of that milk for butterfat content.

Q.5. Are Recorders supervised?

A. Yes. Recorders are supervised by the local Dairy Officer. These Officers pay regular visits to all the Recorders within their areas. They supervise the Recorders' work and submit reports to the Head Office of the Department of Agriculture and Stock.

Q.6. Who supplies the apparatus, stationery, &c.?

A. All equipment is supplied and maintained by the Department of Agriculture and Stock. The Recorder conveys all the necessary equipment from farm to farm. The equipment includes vacuum buckets, which are attached to the milking machine to collect the milk from individual cows, thus obviating the necessity to revert to hand milking. All stationery is supplied free of charge by the Department of Agriculture and Stock.

Q.7. Has the herd owner any forms to fill in?

A. No. The entire recording work is carried out by the Herd Recorder.

Q.8. What is expected of the herd owner?

A. The herd owner must:—

(*a*) Provide overnight accommodation and meals for the Herd Recorder on each occasion of a visit.

(*b*) Make sure each cow is identifiable.

(*c*) Furnish the Herd Recorder, when each cow comes into test, with the name of the cow, tattoo markings, pedigree, age, date of calving, &c., and see that these particulars are entered correctly on the Herd Record Sheet.

Q.9. Must the Herd Recorder be accommodated with the herd owner?

A. No. It is not essential that the Recorder should be accommodated with the herd owner. It is the responsibility of the herd owner to provide accommodation with either himself or one of the farm staff or, if this is not possible, at some convenient point, provided always that the accommodation is within easy reach of the farm.

Q.10. How often is the herd visited?

A. At intervals of 30 days. If this is not possible the visit should be from 25 to 35 days after the preceding visit.

Q.11. Does the herd owner receive prior notice of the Recorder's visit?

A. In order that accommodation may be available it is customary to advise the herd owner a few days before the date of visit.

Q.12. How are cows identified?

A. Cows may be identified by tattoo numbers, numeral fire or acid brands, or numbered tail tags. In small herds where all cows are known by name no such method is required.

Q.13. Must all cows be recorded?

A. Yes. Under the rules all cows yielding milk in a herd must be submitted for recording.

Q.14. Do the yields ascertained by recording represent the actual milk and butterfat produced by the individual cows?

A. No. To do this it would be necessary to weigh the milk at each individual milking, and under an official scheme this would be impossible. Costs would also be prohibitive. The aim of any herd recording scheme is to give herd owners an indication of the production of the individual cows as near to the actual as possible. Monthly tests have been found to give a close approximation to the total milk produced during the lactation period. Tests carried out have shown that the difference between the actual yield and the calculated yield is negligible.

Q.15. What happens to the records?

A. At each test the Herd Recorder uses a shed book in which he enters the yields of individual cows as regards weight of milk and percentage of butterfat. After the weighing and testing have been completed, the yields of milk and test of the individual cows are entered on a monthly Herd Record Sheet. The amount of butterfat for the day is calculated for each cow entered on the sheet, as also is the production of milk and butterfat for a 30-day sub-period. One copy of the Record Sheet is given to the farmer and one forwarded to the Department of Agriculture and Stock, Brisbane.

When the Record Sheet is received at the Herd Recording Office all entries are checked for accuracy, and corrections made where necessary. The Record Sheets are then coded with respect to breed and sire, abnormal tests, &c. The information on the sheets with respect to each cow is then punched into cards prepared for use in special accounting machines. From these cards the total daily production of the herd is compiled by the machines. This enables the daily average production for each herd in the group to be ascertained. A monthly summary of the average production of all herds in the groups is then forwarded to each member of the group. The cards are next used to calculate, and type, the progressive total production of each individual cow in the herd. A copy of this is forwarded to the herd owner and enables him to see how long each cow has been milking and her production to date. Cows which have dried off are also given an average butterfat test. At the end of the Herd Recording year (September 30) the herd owner is given a list of lactation productions for all cows in age groups, together with the average production for the whole of the herd.

BETTER FACE THEM

Q.16. What is the cost to the recording herd owner?

A. The cost of recording is shared by the herd owner, the State Government and the Commonwealth Government. The proportions of the costs are 37½, 37½, and 25 per cent. respectively. The cost to the farmer at present is 8s. 6d. per cow per lactation, or the value of 2½ lb. of butter. To this must be added the value of board and accommodation provided for the Herd Recorder. These costs are allowable taxation deductions. Payment is made by means of an order issued on the factory supplied by the farmer.

Q.17. How much longer does it take to milk the cows during the recording period?

A. The increase in milking time is negligible.

Q.18. What happens if a cow is sick, or gives an abnormal yield, at the time of recording?

A. If, during the Recorder's visit, a cow is noticed to be sick, affected with mastitis, in season, or her yield appears to be abnormal, the Herd Recorder notes this on the monthly Record Sheet. If necessary, a production is given for the month by averaging the productions of the preceding and succeeding months. A similar procedure is adopted when the herd has missed for a month.

Q.19. How does the herd owner join?

A. Application should be made to the local Dairy Officer.

Q.20. When will the herd owner be admitted as a member?

A. Applicants to join a Herd Recording Group are admitted as soon as a vacancy occurs in the Group. If sufficient applications are received, a new Herd Recording Group can be organised by local Q.D.O. Branches, or by the local Dairy Officer. The Department of Agriculture and Stock should be notified by May each year of prospective new groups so that provision can be made for the formation of these in the estimates of expenditure.

Handling and Drafting Cattle

By K. F. HOWARD, Adviser in Cattle Husbandry.

Drafting steers or bullocks on horseback can be a test of patience when the mob becomes stirred. What causes the trouble? The cattle, the men or the drafting system?

Mr. L. McLennan of "Cypress Downs", Jackson, uses a convenient system of horseback drafting which allows speedy drafting with the cattle remaining calm during operations.

Labour is not a major problem. A mob of 500 head can be handled with two men, though an additional man is an advantage.

With this system, smart horses are not essential. The main requirement concerning the horses is that they be quiet.

Drafting 180 head of fats out of 500 head in under two hours is an example of an average job on "Cypress Downs".

On this property, cattle of up to 50 different brands are handled and fattened at the one time. Prior to arriving on the property, these cattle receive a variety of handling methods; some have the reputation of being "toey". This means that the system of drafting and handling has been well tested over the years.

Steady Handling.

The drafting system is not claimed to be the sole reason for the smoothness of the drafting operation.

The method of handling the cattle in the drafting yards is just an extension of the methods employed in the paddock. When mustering, cattle are always approached quietly and are allowed to settle before being moved towards the yards. They are never permitted to trot. Mr. McLennan contends that the extra pains taken in moving cattle steadily is more than compensated by the smoothness of operations, quicker drafting, contentment of cattle and lack of bruising.

Drafting Method.

The drafting yards are in three sections. The cattle are moved quietly into the drafting section and allowed to settle. At the junction of the three sections is a horseman who directs the drafted cattle into the section for "tops" or the section for "rejects".

The drafting method differs from the common method. The usual system is to continue "cutting out" the tops from the mob until the required number of fats is reached.

In the "Cypress Downs" drafting, all cattle file by the drafter so that eventually the drafting yard is empty. As the cattle walk by, the drafter decides if the steer is a "top" or a "reject". As he decides he calls to the man at the junction. The junction-man then directs the steer into one of the two other sections of the yard.

This system of drafting has been used by Mr. McLennan for a number of years with good results. Practically all "Cypress Downs" steers are selected for the chiller trade. Meatworks' gradings of steers average 96 per cent. first quality.

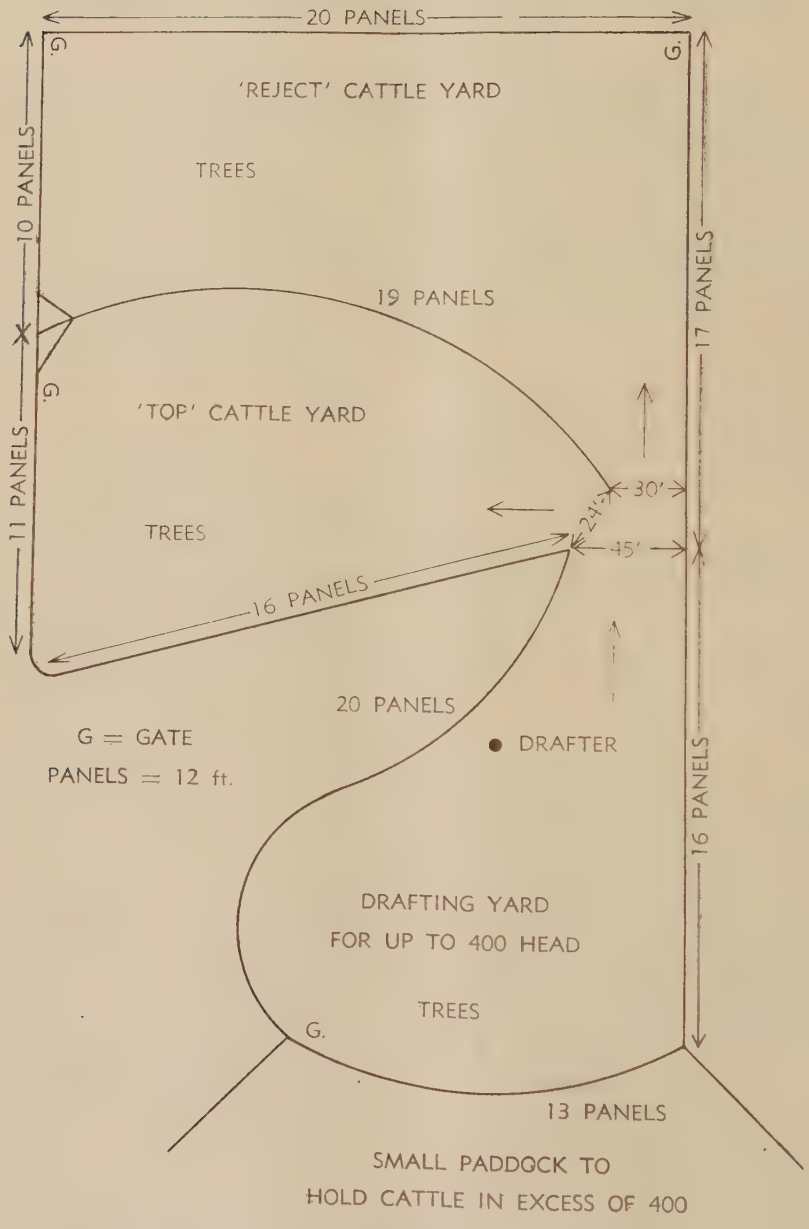


Plate 1.

Sketch Plan of Drafting Yards.

Plate 2.

Cattle Being Yarded Quietly Prior to Drafting.

Plate 3.

Steers are Generally Taken in Singles but here Four are being Allowed to Walk out as they are all "Rejects."

Plate 4.

Bird's-eye View from above the Drafting Yard. The cattle in the background are rejects. The junction-man is standing in the entrance to the section for top cattle.

Plate 5.

The Far Steer has just Moved into the Reject Yard. As a "top" walks forward, the junction-man rides across to block the entrance to the reject yard.

Plate 6.

The Draft has been Completed and Tops Move Quietly off to the Trucking Yard.

Selecting Tops.

Before commencing the draft, the drafter has a good look through the mob so that he knows approximately how many "tops" he has. Apart from steady handling, the success of the system depends on the drafter setting a standard and grading all cattle above or below that standard.

The fact that all cattle eventually move up to the junction means that the inevitable "problem" cattle are only too keen to walk out—sooner or later. It is often these cattle that are the cause of the whole mob getting out of hand in an ordinary camp draft. There is no need to ride into the camp. The cattle are always taken from the "face". Understandably, cattle that have been through the yards once or twice become quite used to the process and realise that there is no necessity for panic.

When more cattle than desired are walking up to the drafter, they are halted but not turned back. With this treatment, the cattle are always keen to walk forward to the junction.

Calm Work.

The "Cypress Downs" method of drafting achieves two objects in addition to those already mentioned. The cattle remain quiet throughout the drafting process and horses and men complete the draft in a state of "coolness".

Particulars of Yards.

A plan of the yards is shown in Plate 1. The posts are the same height as in the normal fence. There are two barbed wires and one plain. The posts are capped with rails throughout the whole yard. The distance between the posts is 12 ft. Shade trees are present in all three sections of the yard.

PLANS DECLARED NOXIOUS THROUGHOUT QUEENSLAND.

The following plants have been declared noxious throughout the State under the Stock Routes and Rural Lands Protection Acts.

Botanical Name.	*Common Name.*
Acanthospermum hispidum	Star burr
Asclepias fruticosa	Narrow-leaved cotton-bush
Asclepias physocarpa	Balloon cotton-bush
Baccharis halimifolia	Groundsel-bush
Bassia birchii	Galvanised burr
Cactaceae	Prickly pears and other cacti
Cannabis sativa	Indian hemp
Cardaria draba	Hoary cress
Carthamus lanatus	Saffron thistle
Cestrum parqui	Green cestrum
Chondrilla juncea	Skeleton weed
Conium maculatum	Hemlock
Cryptostegia grandiflora	Rubber vine
Cycadaceae	Zamia (all species)
Cynara cardunculatus	Artichoke thistle or cardoon
Datura ferox	Fierce thornapple
Datura leichhardtii	Native thornapple
Datura metel	Hairy or recurved thornapple
Datura stramonium	Common thornapple or stramonium
Datura tatula	Purple thornapple
Echium plantagineum	Paterson's curse
Eriocereus martinii	Harrisia cactus
Erythroxylon coca	Coca leaf
Eupatorium adenophorum	Crofton-weed
Eupatorium riparium	Mist-flower
Franseria tenuifolia	Burr ragweed
Gastrolobium grandiflorum	Desert poison-bush or heart-leaf poison
Gaura parviflora	Clock-weed
Hyptis capitata	Knobweed
Ipomoea calobra	Weir-vine
Lycium ferocissimum	African boxthorn
Mimosa invisa	Giant sensitive-plant
Opuntia spp.	Prickly pears
Papaver somniferum	Opium poppy
Prosopis juliflora	Mesquite
Rhodomyrtus macrocarpa	Finger cherry
Rubus fruticosus	Blackberry
Salvia reflexa	Mintweed
Silybum marianum	Variegated thistle
Solanum hispidum	Giant devil's fig
Solanum torvum	Devil's fig
Solanum auriculatum	Wild tobacco-tree
Stachytarphaeta urticifolia	Dark-blue snake weed
Xanthium pungens	Noogoora burr
Xanthium spinosum	Bathurst burr

A Study in Flock Management

A Central-Western Queensland Sheep Station—"Maneroo" Station, Longreach

By G. R. MOULE and R. B. YOUNG, Sheep and Wool Branch.

Much of western Queensland's history is centred on its old established sheep stations.

Settlement soon followed the explorations of Sir Thomas Mitchell, Burke and Wills, Landsborough and Cornish, and it was those early settlers who really opened the country that has contributed so much to Queensland's wealth during the last 75 years.

The Lomax brothers were amongst those vigorous pioneers who rode west in search of sheep lands. They took up "Maneroo," near Longreach, in 1882; their early association is perpetuated in the property's horse and cattle brand, 2LX.

"Maneroo" has always been one of the "big" stations. In 1913 it comprised about 250,000 acres, and carried 82,000 sheep. Following resumptions the flock was down to 58,000 by 1926, and today it numbers 45,000.

"Maneroo" is about 28 miles from Longreach, in Central Western Queensland. It is about 185,000 acres in area, and is transected by the West Darr and Darr Rivers. These many-channelled watercourses follow a

Plate 1.

The "Maneroo" Homestead. The homestead was built in 1912. The central dining room-lounge is 75 ft. long and 18 ft. wide. An athel tree planted by H.R.H. The Duke of Gloucester can be seen at the right of the picture.

southerly direction to join the Thomson River near Arrilalah.

SOILS AND VEGETATION.

Apart from river channels, the property consists mainly of undulating grassy downs, interspersed with red sandy ridges. The soils are brown and heavy in texture.

Mitchell grasses (species of *Astrebla*) predominate on "Maneroo," but Flinders grass (species of *Iseilema*) and button grass (*Dactyloctenium radulans*) occur as annuals.

Herbage is not a marked feature of the central-western sheep country. However, soft roly-poly (*Salsola kali*), pigweed (*Portulaca oleracea*), carrot (*Daucus glochidiatus*), saltbushes (species of *Atriplex*), red burr (*Bassia echinopsila*), yellow burr (*Bassia anisacanthoides*), daisy burrs (species of *Calotis*), crowfoot (*Erodium cygnorum*) and tarvine (*Boerhavia diffusa*) occur during favourable seasons.

The timber on "Maneroo" has been carefully preserved. Gidyea (*Acacia cambagei*) and boree (*Acacia cana*), particularly the latter, are well distributed over the property and provide shade and protection for sheep in the lambing paddocks. Whitewood (*Atalaya hemiglauca*), supplejack (*Ventilago viminalis*) and leopardwood (*Flindersia maculosa*) also occur frequently. Coolibah (*Eucalyptus microtheca*) is common on all creeks.

CLIMATE.

"Maneroo" is in the semi-arid part of pastoral Queensland. The average rainfall during the 72 years for which records exist has been 15.5 in. However, wide year-to-year fluctuations have occurred. Average and above-average falls have been interspersed with severe droughts in the years 1915, 1916, 1926, 1927, 1928, 1935, 1939, 1945 and 1948. Minor droughts occur during about four years in 10.

Most of the rain falls in summer, and is seldom distributed over more than two or three months, generally between December and March.

The weather can be hot at "Maneroo." During November, December, January and February, shade temperatures are usually over 95 deg. Sometimes prolonged heat-waves occur, when maximum temperatures may exceed 100 deg. for three weeks on end. The winter weather is mild and sunny. Minimum temperatures seldom fall below 40 deg., and the maximum is in the vicinity of 75 deg.

PROPERTY IMPROVEMENTS.

There are 63 sheep paddocks on "Maneroo," varying in size from a few hundred acres to 14,000 acres. The average paddock size is about 5,000 acres, with most of the larger ones varying from 4,000 to 8,000 acres. Subdivision has been carefully studied in relation to water improvements, whilst still maintaining sizable areas in the larger paddocks. This allows sheep a variety of pasture and lessens close stocking and danger of worm contamination.

Here's how the Manager (Mr. Colin Johnstone) explained the Company's policy on stocking—

"Our general policy is light stocking and continuous grazing except in the case of a few river paddocks. These are very dangerous and are stocked heavily (1 sheep to 1½ or 2 acres) from May to December, and then the sheep are moved back off the rivers to paddocks that have been spelled. Broadwater paddock (14,000 acres, with frontage to the Thomson River) is used mainly for weaning; it carries 7,000 weaners from about June until the following January or February and is then spelled. We have had wonderful results from stocking such a large paddock fairly heavily

with young sheep, which, incidentally, are put there after the second drenching since weaning."

"Maneroo" is watered by one small artesian bore with a daily flow of 22,000 gallons, about 18 sub-artesian bores, and 14 excavated tanks. These tanks vary in size from 45,000 cubic yards on the slow catchments to 20,000 cubic yards on the faster catchments. All excavated tanks are equipped with mills, receiving tanks and troughing.

All except four tanks have proved permanent over the years. Three of these have been supplemented by nearby sub-bores which pump into the supply system when the need arises. At the fourth, East Camp, another excavated tank has been sunk, giving a total capacity of 43,000 yards, plus a huge backwater. It is expected that this particular water improvement would still have a full 20,000 yards excavation even after two years without replenishment.

"Maneroo" also has frontages of 21 miles to the Darr River and 12 miles to the Thomson River. On both of these there are several almost permanent holes.

A full-time windmill expert and car mechanic are kept busy with maintenance work on water improvements and vehicles.

"Maneroo" has several sets of well constructed sheep yards, the "bugle" type of yards at Bandour being very convenient for sheep work. Bough shed shades covering much of the working parts of most of the yards make for greater comfort for men and sheep.

The station is equipped with jetting plants, spray dips handy to the woolshed, fire-fighting equipment, and windmill and bore replacements. Land Rovers are prominent amongst the vehicles, and are used widely for boundary fence repairs, inspection and cross-country travel.

Plate 2.

Wool Room and Water Supply at "Maneroo" Woolshed. The shearing board covered by the roof in background is 53 yd. long and 9 yd. wide. Beneath the cover of the woolshed is wet-weather protection for 1,000 sheep.

FLOCK MANAGEMENT.

The "Maneroo" flock is composed of about 10,000 stud and 35,000 flock sheep. This gives a stocking rate of about 1 sheep to 4 acres. The well-grassed paddocks reflect the wisdom of the stocking policy that "Maneroo" owners have followed during the years.

The shearing is done by contract during February and March. All sheep are dipped in the power spray dip. This ensures that the sheep are kept free from body lice. It also means that the sheep are short-woolled during the autumn, when blowflies may be active.

The channels of the Darr and Thomson Rivers that pass through "Maneroo" can harbour Noogoora burr. Therefore, contract labour is employed during March to spray and cut burr. A vigorous programme of burr control has paid handsome dividends in preventing the spread and keeping the "Maneroo" clip free from vegetable fault.

During late March and early April the rams are prepared for mating. Any with unsound reproductive organs are culled. Horns and feet are checked and any rams likely to be out of condition because of fighting wounds are held back to join the ewe flock later. The sheep are usually mated in the second half of April or in early May, depending on seasonal conditions. By this time the weather is usually becoming cooler, and it is therefore unlikely to have an adverse effect on fertility. About $1\frac{3}{4}$ per cent. of rams are mated initially, and a further 1 per cent. three weeks later.

In May the weaners are drenched with phenothiazine as a precaution against worm infestation. The ewe flock is drenched in the late winter or early spring if seasonal conditions demand. This is done to free the ewes of worms prior to lambing, and to obviate an increase in the barber's pole worm during the early summer.

The rams are examined about six weeks after they are removed from the ewe flocks. Any that are aged and whose reproductive organs are unsound are culled. An early order is placed with the stud for new rams.

In July the weaners are crutched and treated with the Mules operation by the overseer and other station labour.

In August the dry sheep are crutched with contract labour. The crutching of the breeding ewes before lambing in September is done by contract labour.

For several years lambing trials have been carried out on "Maneroo" in conjunction with officers of the Sheep and Wool Branch of the Department of Agriculture and Stock. These, when considered with trials done in other Queensland sheep areas, gave valuable information about causes of lambing losses. Other breeding trials were carried out. By finding which ewes lambed and were able to rear healthy lambs year after year, it was possible to identify groups of ewes that were above-average mothers. Other investigations into milk yields and quantities of milk given by ewes over a period under different rations of feed also gave valuable information.

"Maneroo" lamb-marking takes place during November and December. The importance of cutting lamb's tails correctly is fully realised. Great care is taken in this work, and jackeroos are especially trained to cut the tail level with the tip of the vulva, and so that the bare skin will heal over the severed stump.

The young sheep are classed in January and the older flocks are culled. Aged and surplus sheep are sold, and there is a keen local demand for such large straight lines of sheep.

Occasionally dingoes prey on the "Maneroo" flock, and their importance, as well as that of other predators such as foxes, pigs, crows and eagles, is

well known to the manager and his staff. They wage a year-round war on these enemies with poison, rifle and trap. This campaign is always intensified before lambing starts.

Attention to management details of this kind has paid "Maneroo" handsome dividends. The average percentage of lambs marked to ewes mated from 1913 to 1949 was 53.5. This compares very favourably with the State average of just a little better than 50 per cent. It is also high for the Longreach Shire, where the average lamb-marking percentage has ranged between 42 and 50 per cent. during the last 15 years. The individual lamb-marking percentages for "Maneroo" for four recent years have been:—

1952	..	..	66
1953	..	..	43
1954	..	..	74
1955	..	..	63

The "downs" central-western country of Queensland is suited to the growing of good combing length wools, free from vegetable fault. The wool is usually sound, of a 64's to 70's count, and has a greyish tip. The cut per head of sheep in the Longreach Shire has averaged between 7.5 and 8.0 lb. of greasy wool during the last 12 years. The fleece weights of the "Maneroo" flock during the last 26 years have averaged 8.5 lb. greasy wool, crutchings excluded. During recent years grown sheep in the flock have cut an average weight of 9.78 lb. In 1955 a group of 327 paddock-fed special stud ewes cut 18.2 lb. of greasy wool per head.

Careful attention is paid to advances in the industry as reported in agricultural, veterinary, C.S.I.R.O. and Agriculture Department periodicals, papers and pamphlets. New suggestions of improved methods and techniques of animal husbandry and property control are carefully studied, and, where thought applicable to local conditions, are introduced either experimentally or as permanent features of the management. Services provided by Government Departments and private firms are used for husbandry problems.

FODDER CONSERVATION AND STORAGE.

Drought is the largest and most widespread problem facing the Queensland sheep industry. Sheep located in the Longreach district and at least part of the "Maneroo" flock were moved to agistment 11 times between 1915 and 1939. During some of the less severe droughts sheep have been fed grain and/or lucerne hay.

Today, "Maneroo" has three prefabricated steel silos for the storage of grain and sheep nuts. These hold between 1,500 and 2,000 bus. each. These neat tower-like structures eloquently express the present-day trend towards fodder conservation.

However, the hand-feeding of 35,000 sheep during a prolonged drought is no mean task. Thus, the fodder being stored below the ground, but not so obvious as the prominent grain silos, is probably more important. In 1955 a crop of 120 acres of Sugardrip sorghum was planted during early June. A further 400 acres were planted in 1956 and another crop was successfully ensiled. Working in this way it should be possible to conserve anything up to 10,000 tons of silage—enough to feed 25,000 sheep for 9 months.

Farming in the semi-arid central-west is difficult. It calls for precise timing, and this in turn demands a large quantity of agricultural machinery. The "Maneroo" plant includes an Oliver crawler tractor, a Shearer "Kingseeder" for ploughing and sowing, an Allis Chalmers forage harvester, and the usual assortment of 2-3 ton side-tipping trailers.

CALENDAR OF ACTIVITIES.

Here is a summary of their activities:—

January: With almost the full growth of wool, classing and culling takes place. Both stud and flock sheep are classed, about 30-35 per cent. of ewe hoggets being culled. About 10 per cent. of uneconomic wethers are removed from hoggets for later use as killers.

February-March: Part of shearing takes place, and following the shearing, which is done by contract, all sheep are passed through spray dips for louse control. Sorghum is planted for crop silage. Contract labour cuts the Noogoora burr during March.

April: General shearing is done. Rams are prepared for joining and checked for defects of the reproductive organs. Rams are joined with the ewes in mid-April. Sorghum harvesting takes place in late April.

May: Weaners are drenched with phenothiazine for worm control. Sorghum harvesting is completed and the first ploughing for the following year's sorghum planting is carried out. Cattle and horse branding is done, and fat cattle are taken off for market.

June: Rams are removed from ewes. Ewe hoggets are crutched and the Mules operation performed on them. The Mules operation is done by station labour.

August: Young sheep are crutched and wigged. Stud and flock service rams are shorn. Jetting of other sheep commences.

September: All sheep not crutched are jetted. Ewes are placed in paddocks for lambing. Firebreaks totalling 450 miles are ploughed with station labour and plant.

October: Second calf and foal branding is done.

November-December: Lamb-marking of the season's drop of lambs is carried out. Pits are sunk for sorghum silage.

BUILDINGS AND PERSONNEL.

The huge woolshed is a prominent feature of "Maneroo." It is seven miles south-east of the homestead, and both flock and stud sheep are shorn there. This woolshed is famous throughout pastoral Queensland as one of the largest remaining woolsheds in the State.

Built in the form of a "T," the vertical arm forms the wool room and storage space, and the horizontal arm the shearing board and sweating and catching pens. The shearing board is 53 yards long and 9 yards wide. The wool room and storage, built on two levels to facilitate pressing, is 29 yards by 18 yards. A half-circle iron roof covers each of the two portions, and beneath the cover of the shed is wet weather protection for 1,000 sheep. The shearing board has stands for 23 shearers, of which 16-18 are still used.

Homestead and surrounding buildings, large store, jackeroo's and station hand's accommodation, mess buildings, vehicle sheds, equipment sheds, stables, silos, and stockyards spread over a considerable area like a small township.

The homestead and accommodation are served with electric lighting, and sanitation is provided by septic systems. The neatly fenced buildings and enclosures lie amongst shady athel trees on pebbly ridge country that slopes gently towards the Darr River.

A modern gauzed-in cottage houses the overseer and his wife close to the main homestead.

The several outstations on "Maneroo" are modern cottages for the accommodation of married couples. The boundary riders stationed at these look after the flocks and fences in their areas, and are in daily telephone communication with the overseer.

The present manager, the genial Mr. Colin Johnstone, came to "Maneroo" in May, 1955. Now in his early thirties, he has served 13 years with the Company, having seen service from jackeroo to Manager on "Maneroo," "Charlton," "Retro," "Milroy," "Danillo" and "Angledoon."

The present overseer, Mr. R. F. Cowley, an able and confident young officer, gained early experience on the wide Flinders grass plains at "Carandotta," "Arjuna" and "Compton" in the far north.

The jackeroos and station hands employed on the property are mostly big, quiet, active young men. In talking to them one gets the feel of the "Maneroo atmosphere" of "saying little and working hard." It is not hard to understand why, in the capable hands of these well trained employees, the sheep get jetted, the horses get ridden, and the bush fires are put out!

SOME HISTORICAL ASSOCIATIONS.

"Maneroo" is still one of the big properties in Queensland's sheep pastoral country. When the Lomax brothers first settled at "Maneroo" they built the hut they called a homestead on the banks of the Thomson River, to be near water, precious for life of humans and stock. The homestead was moved to its present site on the West Darr in 1908. McMillan, Dalgety and Company Ltd., and the Australian Mercantile Land and Finance Co. Ltd. have been their successors.

Today the old homestead, built in 1912, has historical links; it stands as a solid symbol for the future. The

Plate 3.

Modern Improvements at "Maneroo." The comfortable Overseer's cottage. In the foreground are pet brolgas, descendants of brolgas that have been pets around the homestead since the early 1920's.

central dining room and lounge are 75 ft. long and 18 ft. wide. Its foot-thick walls, part of the original structure, are made of pise. These cool and gracious rooms carry an atmosphere of dignity and comfort.

The late Mr. K. Whitty and Mr. C. G. McKechnie were two of "Maneroo's" early managers who set high standards of efficiency for other managers to follow.

The story is still told of Mr. Whitty, who, when thrown from a horse and breaking his leg whilst mustering, lay cheerfully for hours until found, since he had trained himself to suck pebbles to counter thirst in the long hot days.

Mr. Clyde Guthrie McKechnie—"Keckie" as he was affectionately called by all who knew him—was a stern disciplinarian. He served for 23 years on "Maneroo", and then became Pastoral Inspector. He would drive out to outstations and then saddle a horse and inspect fences. On one occasion one of the many boundary riders' small children was peeping out from behind the hut, and reporting the visit to her mother. "Keckie's here, Mum. Keckie's in the horse yard. Keckie's saddling up. Keckie's getting on Keckie's on, Mum. Keckie's off!" He was a good rider, too. His association with "Maneroo" did more, perhaps, for the property than has been achieved by any other man.

About 10 years ago, T.R.H. the Duke and Duchess of Gloucester visited "Maneroo". The Duke rode bareheaded amongst the sheep in the wide paddocks. To mark his visit he planted an athel tree outside one corner of the homestead. The tree is now 25 ft. high, a mass of leafy shade. Magpies warble from its branches, and willy wagtails call with their persistent cry "Sweet pretty little creature".

"MANEROO" AND THE SHEEP INDUSTRY TODAY.

Throughout the years scores of jackeroos have sat at the big dining room table at the homestead. The A.M.L. & F. Co. has always trained its own managers and overseers on its company properties. Many young men trained there have properties of their own now, or are associated in some way with the sheep industry. The young men who have passed through "Maneroo" have been fortunate. They have been trained in administration as well as in flock and property management. They have learned to appreciate the importance of good records.

These are the steps that lead to progress. Efficient men with a genuine love of the land can make the richest contribution to the welfare of the sheep industry.

Just as "The Battle of Waterloo was won on the playing fields of Eton", so in this younger country the training grounds of the big western sheep stations have paved the way to a sound and prosperous sheep industry.

How Wool Is Marketed

The following extracts from the "Statistical Handbook of the Sheep and Wool Industry" published last year by the Bureau of Agricultural Economics explain wool marketing procedures in Australia and London.

Except for Government acquisition of the whole clip during the two world wars, public auction has always been by far the most important method of disposing of the Australian wool clip.

The first auction of wool in Australia was held in Sydney in 1843, and in 1848 auction selling commenced in Melbourne. Although the amount of wool sold in Australia increased steadily, London remained the most important centre of the trade in the world until the close of the last century. At present, more than 90 per cent. of the wool produced in Australia passes through the Australian auction system. With an average of more than one million bales offered annually, Sydney has become the world's most important selling centre.

Auction selling centres have been established in all Australian State capitals, as well as at several other cities. To save space, only a certain proportion of each lot of bales is displayed prior to sale, but buyers may inspect the bulk if they desire.

To facilitate speed of selling, the catalogues are divided into Large Lots and Star Lots; in the northern selling centres (Brisbane, Newcastle, Sydney and Goulburn), Large Lots are five bales and over, in southern centres (all others including Perth), four bales and over. In order to attract wider bidding, Star Lots on account of various owners are often inter-lotted to form composite Large Lots. Small parcels of wool-bags (or sacks) and butts (or fadges)—and any very unevenly classed lots—are, as a rule, bulk-classed or re-packed into bales to make them eligible to be offered as relatively uniform Large Lots.

All wool is offered in order of date of receipt into store, a rule which is rigidly adhered to; a minor variation applies to New South Wales, where a zoning system operates, the object of which is to make available early in the season fine free wools which would not otherwise come on to the market until after Christmas.

The charges made by the selling brokers for their services in handling and selling the wool are standard for all firms in each centre, but there are certain differences between centres. The charge for receiving, warehousing, advertising, cataloguing, etc., made during the 1955-56 season in Victoria, South Australia, Western Australia and Tasmania was $\frac{11}{16}$d. per lb. In New South Wales and Queensland the charge was:

	Greasy Wool.	Scoured Wool.
	s. d.	*s. d.*
Per bale ..	15 6	11 0
Per butt ..	7 0	5 0
Per bag ..	3 0	3 0

The selling commission rate charged during the 1955-56 season in the various States was as follows:—

Queensland.—On a season's wool clip realizing £A1,000 or under the rate is 2½ per cent. When the season's clip realizes over £A1,000 the rate is 1½ per cent.

New South Wales.—On a season's wool clip the rate is 2½ per cent. on the first £A1,000 and 1½ per cent. on the balance of the clip's proceeds.

Victoria, South Australia, Western Australia.—On a season's wool clip the rate is 3 per cent. on the first £A500, 2 per cent. on the next £A500 and 1½ per cent. on the balance of the clip's proceeds.

Tasmania.—On a season's wool clip the rate is 5 per cent. of the first £A50, from £A50 0s. 1d. to £A500 the rate is 3 per cent., from £A500 0s. 1d. to £A1,000 the rate is 2 per cent. and on the balance of the clip's proceeds the rate is 1½ per cent.

Delivery charges at all Australian centres is 10s. per bale.

Charges are also made for interlotting, re-classing, re-conditioning wet wool, bulk classing and repacking where these are applicable. These and any further charges paid on the grower's behalf, such as freight and insurance, are deducted from the gross proceeds payable to the grower.

The terms and conditions of sale are laid down by the Wool Selling Brokers' Association at each centre. Any disputed claims between selling brokers and buyers are dealt with by a Joint Standing Committee of selling brokers and buyers; an arbitrator is appointed in any case where agreement cannot be reached.

The conditions of sale provide that no person shall advance less at each bidding than one farthing per lb. on all descriptions of wool and at any time during the sale shall (if required) deposit 25 per cent. of the selling brokers' estimated value of his purchase. The conditions also provide that all wool shall be paid for in cash prior to removal from selling brokers' stores. All wool sold at auction and pending its removal by the purchaser is insured by the selling broker against loss or damage by fire under an ordinary policy of insurance to an amount not exceeding its invoice value.

The "prompt period," i.e., the number of days which elapse before payment is made after the sale, is determined annually after an examination of statistics relating to the shipment of wool, and during recent years the period has been 21 days; this period has been common to all centres. However, if due to industrial unrest the buyer cannot ship the wool he purchased, provision is made for the suspension of his obligation to pay for his purchases until such time as he is in the position to ship them.

Matters that affect more than one selling centre are dealt with by the National Council of Wool Selling Brokers, a voluntary association, the membership of which is open to all wool selling brokers.

The National Council of Wool Selling Brokers, after consultation with the Australian Woolgrowers' Council and representatives of the Bureau of Agricultural Economics, in July of each year publishes estimates of receipts into store and of production for the forthcoming season. Using the receipts into store as a basis, the wool selling programme for the first half of the season is then prepared and, after agreement has been reached with the Australian

Council of Wool Buyers, the programme is published for the information of all concerned in the selling, buying, shipping and manufacturing sections of the trade. The programme for the second half of the season is issued in December after a revised estimate of the clip has been made.

During the course of the season the National Council issues monthly statistical data in regard to wool sales in all Australian centres and at the close of each season issues a summary of the season's transactions.

London as a Selling Centre.

The first Australian wool (a bale of 245 lb.) was sold in London in 1808 on account of Captain John Macarthur.

From 1910 onwards regular shipments of wool were made to England and, in 1816, 73,171 lb. of Australian wool passed through the English Customs. Garraway's Coffee House was significant in the early days as a centre for the auctioning of Australian wool.

With the growth of the Australian wool industry London became a most important wool selling centre. In 1875 the Wool Exchange was built in Coleman Street and, with the exception of the two war periods, wool has been sold there ever since. Apart from the two post-war periods, when auctions were arranged at Liverpool, Bradford, and other centres for the sale of accumulated stocks, London has been the only centre in Europe where Australian, New Zealand and South African wools have been auctioned, and for more than a century it has been the most important "spot" wool market in the world.

Public auctions are held about six times a year, each series lasting two to three weeks. All wool on ships reporting at Lloyds as off the English coast by 4 p.m. on the Monday afternoon eight days before the opening of any series is eligible for inclusion in that series. The London brokers do not own warehouses, but use the Port of London Authority's and privately-owned warehouses in the vicinity of the docks. Wool purchased at the auctions can be ordered out of the store within 24 hours of the sale. Supporters of London as a selling centre emphasise its importance as a "spot" market, and its proximity to the heavy consuming centres in the United Kingdom and Europe.

During World War II, wool selling ceased in London and the offices of many London wool brokers were badly damaged by bombs and fire. When sales were recommenced in September 1946, the broking houses had pooled their facilities, and, although retaining their identities, had formed an association know as the Committee of London Wool Brokers, to further their common interests.

The proportion of the Australian clip shipped either direct or through brokers for auction in the United Kingdom has been steadily falling. In the 1920's between 250,000 and 300,000 bales of Australian wool (10 per cent. to 15 per cent. of the clip) were being auctioned in London each season. For the last two or three seasons before World War II, shipments of this nature had fallen to around 200,000 bales a season, a little over 5 per cent. of the clip. During the war these shipments ceased, as all wool had to be submitted for appraisement and purchase in Australia under the United Kingdom purchase arrangement then operating.

Since the war this channel of trade in wool has been resumed only on a moderate scale, and in recent times approximately 50,000 to 60,000 bales of Australian wool have been auctioned in the United Kingdom each season; this represents not more than 1 per cent. to 2 per cent. of the clip.

CONFERENCE OF ENTOMOLOGISTS IN BRISBANE.

The second biennial conference of Commonwealth and State entomologists, held in Brisbane, was attended by representatives of various Commonwealth and State organisations. All States were represented.

Similar conferences of Australian entomologists were held from time to time under the aegis of the Standing Committee on Agriculture. In 1954 the Standing Committee decided that such conferences should be held regularly every second year and should rotate among the several States. The first of the series of biennial conferences was held in Sydney in 1955.

Representatives at the Conference of Entomologists.

Back row.—Mr. J. A. Weddell (Technical Administrative Officer, Queensland Dept. of Agriculture and Stock); Mr. F. A. Perkins, Chief Lecturer, Dept. of Entomology, University of Queensland); Mr. W. G. Wells (Director, Division of Plant Industry, Queensland Dept. of Agriculture and Stock); Mr. K. L. Taylor (Technical Secretary, C.S.I.R.O. Division of Entomology); Mr. A. F. Gurnett-Smith (Senior Liaison Officer, C.S.I.R.O. Agricultural Research Liaison Section); Mr. W. J. Bettenay (Supervisor, Fresh Fruit Exports, Commonwealth Dept. of Primary Industry); Mr. P. C. Hely (Senior Entomologist, N.S.W. Dept. of Agriculture); Mr. A. R. Brimblecombe (Senior Entomologist, Queensland Dept. of Agriculture and Stock); Mr. G. S. Dun (Senior Entomologist, Dept. of Agriculture, Stock and Fisheries, Papua-New Guinea).

Front row.—Dr. T. H. Harrison (Director of Plant Quarantine, Commonwealth Dept. of Health); Mr. S. Fish (Chief Biologist, Victorian Dept. of Agriculture); Mr. T. W. Hogan (Senior Entomologist, Victorian Dept. of Agriculture); Mr. D. C. Swan (Head, Dept. of Entomology, Waite Agricultural Research Institute, Adelaide); Dr. W. A. McDougall (Chief Entomologist, Queensland Dept. of Agriculture and Stock); Dr. D. F. Waterhouse (Assistant Chief, C.S.I.R.O. Division of Entomology); Mr. S. C. Allman (Chief Entomologist, N.S.W. Dept. of Agriculture); Mr. C. F. H. Jenkins (Chief Entomologist, Western Australian Dept. of Agriculture); Mr. L. W. Miller (Chief Entomologist, Tasmanian Dept. of Agriculture).

Aircraft In Australian Agriculture*

By D. D. SHAW, Bureau of Agricultural Economics.

During the year ended 30th June, 1956, the area of land treated in Australia by aircraft in regular commercial operations exceeded one million acres. Nearly half this area was topdressed with superphosphate; about 100,000 acres of pasture were seeded either with seed alone or with seed mixed with the superphosphate; and the remaining area, exceeding half a million acres, was treated with insecticidal or herbicidal sprays. This was achieved by 70 to 80 aircraft in a total flying time of 21,288 hours. More detailed information is set out in the accompanying table.

In addition a further 220,000 acres of land were air-sprayed on behalf of the Victorian Department of Agriculture by aircraft operated by the R.A.A.F. and T.A.A. in the campaign against the Australian plague locust.

These figures clearly indicate that the agricultural aviation industry is already playing a significant role in Australian agriculture. This role, however, is small compared with the major contribution of the highly developed industry in New Zealand. In that country superphosphate spreading is the principal aerial work undertaken and, for the year ended 31st March, 1956, aircraft topdressed more than 3,850,000 acres of land with nearly 405,000 tons of superphosphate. The quantity of superphosphate spread from the air was 38 per cent. of the total quantity of fertilizer delivered from works during the year. In this operation more than 200 aircraft were engaged and the flying time involved was 79,747 hours.

TABLE 1.

AERIAL AGRICULTURAL OPERATIONS : AUSTRALIA.

Twelve months ended June 30, 1956.

State.	Superphosphate.			Insecticide and herbicide.	Seed.		Total area treated (*a*).
	Super.	Super. and seed.	Quantity.				
	acres.	acres.	tons.	acres.	lb.	acres.	acres.
N.S.W. ..	253,624	66,040(*b*)	19,063	155,326	68,682	4,175	479,975(*c*)
Qld. ..	..	..	..	100,671	29,650	15,085	115,756
S.A. ..	41,373	..	3,121	80,269	..	..	121,642
Tas. ..	11,760	..	1,094	..	..	..	11,760
Vic. ..	99,843	..	7,678	132,327	..	..	232,170
W.A. ..	24,381	10,996	1,187	79,363	29,047	..	114,740
Total ..	430,981	77,036	32,143	547,956	127,379	19,260	1,075,943

(*a*) This total excludes the special attack on the Victorian plague locust in which the R.A.A.F. and T.A.A. sprayed some 220,000 acres of pasture. It also excludes the work performed (for nine months) by one small operator based in Queensland. (*b*) Including 1,500 acres gypsum and seed. (*c*) Including 710 acres on which other materials were dropped.

Source : Department of Civil Aviation.

* Reprinted from the *Quarterly Review of Agricultural Economics.*

While the development of the Australian agricultural aviation industry has lagged by comparison with its counterpart in New Zealand and other advanced countries, sufficient has occurred to demonstrate the industry's ability to serve Australian agriculture and to point to the very great potential field for aerial agriculture in this country. The kinds of operation likely to be most significant in Australia may now be discussed.

Pasture Topdressing and Seeding.

The benefits arising from the establishment of improved pastures and the use of superphosphate in the better rainfall areas of southern Australia are well known. The chief advantage of aircraft in this field lies in their ability to treat land which is inaccessible to ground machinery because of the steepness of the terrain or because of surface obstructions such as stones or fallen timber.

To date pasture development has taken place mainly in the easier level and open country but as this proceeds the opportunity for the treatment of the more difficult and hilly country becomes greater. The use of aircraft in pasture seeding and topdressing can avoid the need for the expensive clearing up of dead timber and allows the earlier and more rapid establishment of pastures than do conventional means. It is generally considered that aircraft may be used to spread superphosphate more evenly than any ground equipment with the exception of direct drop machines.

In these southern parts of Australia, where superphosphate is used in conjunction with subterranean clover, the most promising areas for development by aerial means lie in the Tablelands Divisions of New South Wales, in the Gippsland and North-eastern Divisions of Victoria and in Tasmania. The total area involved in these districts alone might be in the order of five million acres.

In Queensland, Rhodes grass and green panic are being seeded from the air into ring-barked and chemically treated brigalow scrub land. The area of brigalow scrub in Queensland capable of economic development has been estimated at about 14 million acres. In this region superphosphate is not being used and, owing to the greatly reduced weight of material to be lifted, pasture establishment by aerial seeding can be undertaken at very attractive rates. The flying charge for aerial seeding is usually about 6d. per lb. of seed and up to 10 lb. of seed per acre is normally sown. With the large areas involved and the obstructions to ground equipment caused by standing and fallen timber, aerial seeding is very frequently the only practicable method of sowing pasture in these areas.

In the southern parts of Australia superphosphate is essential to pasture establishment and it should be applied initially at the rate of at least 1 cwt. per acre. The existing flying charges of 6s. to 7s. per cwt. of superphosphate, which are additional to the charges for seeding, are a deterrent to the greater use of aircraft in pasture development in these areas. In addition, there is a considerable area where topdressing with ground machinery is difficult and the costs marginal. Any reduction in flying charges could thus be expected to result in a greater use of aircraft for routine pasture topdressing.

While not at present directly competitive with ground equipment on the easier country, aircraft have the advantage of speed, often permitting more timely topdressing, and their use overcomes the need for landholders to own and maintain machinery which may not be fully utilized.

The Queensland Brigalow Country.

Brigalow scrub may be destroyed by spraying with the hormone types of herbicide which are effective at very low rates of application. The only practicable way of applying these sprays is from the air and already significant areas have been so treated in Queensland, with encouraging although variable results. Generally, the brigalow scrub is associated with soils of high fertility in a region of satisfactory rainfall. These lands are capable of supporting intensive agriculture and grazing and represent possibly the greatest development potential in Australia. Under dense brigalow they are virtually useless.

The use of aircraft in this field is dependent on cost and the results which may be achieved with the hormone types of spray under varying circumstances.

At present aerial spraying of brigalow costs from 35s. to 45s. per acre, including a flying charge of about 20s. per acre. The scrub can also be cleared with heavy tractors at a cost of about 35s. and, where the land is to be used for agriculture, the regrowth of suckers can be controlled, without additional costs, with the heavy implements used in the initial ploughing.

In the development of agricultural land where comparatively small areas are required to be brought into production in a short space of time, the use of tractors and ground equipment is to be preferred.

Under ideal conditions, particularly in tall virgin brigalow, air-spraying usually results in a very satisfactory kill of the trees and a very rapid increase in the grazing capacity of the land. While the treatment of very large areas may be undertaken, the problem still remains of disposing of the standing dead timber, and the premature use of fire involves the risk of stimulating a regrowth of suckers which can be denser than the original scrub. If the land is required only for grazing, it is no great disadvantage to wait for a period of years before firing. It is likely that after about five years the brigalow will be exhausted and the regrowth of suckers overcome.

Air-spraying of brigalow in Queensland during the last five or six years has been attended by widely differing results, some of which were grossly unsatisfactory. These are associated with the very great range of variable factors involving the brigalow and the spraying operation. Important among these factors are the growth habit of the brigalow (virgin scrub or regrowth, tall trees or dense whipstick scrub, etc.), the starch reserves of the plants, the season of the year and growth activity, the quantity and formulation of the herbicide applied, and the temperature and humidity conditions ruling during the operation.

The Queensland Department of Agriculture and Stock has undertaken a programme of research into this problem and useful results have already been obtained. It is hoped in the future to be able to indicate the optimum circumstances, formulation and quantity of material for each spraying situation and to be able to predict the results which may be achieved. It has already been established, for instance, that good results follow the spraying of tall virgin brigalow or young sucker regrowth.

In spite of the unsatisfactory results obtained in some instances, it is clear that air-spraying is a most powerful additional means of developing the brigalow country. The perfection of the technique and the lowering of costs are matters of considerable importance.

Insects and Weeds.

The protection of crops and pastures against insect and weed infestation has been the principal field of aerial agricultural operations in the United States. In Australia, commercial aerial agriculture commenced in 1948 with the spraying of linseed crops in northern New South Wales for their protection against the Heliothis caterpillar, but until recently this field of activity remained comparatively neglected.

Crop protection by aerial spraying has to a large extent depended on the introduction since the war of powerful agricultural chemicals such as DDT and the hormone types of selective herbicides.

These chemicals have proved much more effective than those previously available and the whole field of crop protective spraying has been widened considerably by their introduction. Further, since they are effective at very low rates of application they have enabled the development of the technique of low-volume spraying. The reduction in the weight of material to be lifted has facilitated their application by aircraft.

The principal advantage of aerial treatment is the speed of operations and the timeliness of the protective spraying which this allows. The second advantage lies in the avoidance of damage to the growing crop which is often unavoidable when ground equipment is used. For the treatment of forest areas there is no alternative to the use of aircraft and in tall growing crops spraying from the ground becomes particularly difficult.

Aircraft have been used effectively in Australia both for the routine and emergency spraying of crops for protection against insects and for the control of weeds. Crops treated have included wheat, barley, linseed, cotton, tobacco, potatoes and even vegetable crops in small areas, some of less than one acre. Pastures and lucerne are also treated by aerial spraying.

For routine spraying operations flying charges have been competitive with the cost of ground operations with the added advantages of convenience and absence of crop damage. The flying charges for emergency operations have often been high because of the shortage of aircraft for this work.

Other Uses of Aircraft.

Reference has been made to three of the leading fields of aerial agriculture in Australia. Briefer mention may be made of other activities, although some of these may be no less important either now or in the future.

Aircraft are being used for the treatment of noxious weeds occurring in isolated patches, such as thistles, Bathurst burr and Noogoora burr; for the dropping of poison baits for the destruction of wild dogs and dingoes; and for the spraying of swarms of the Australian plague locust. In each case aircraft have proved themselves, particularly in sparsely populated and remote regions or where access is difficult, by their ability to travel quickly between scattered points of operations and to seek out areas requiring treatment.

Aerial survey work has, of course, become an integral part of land surveying and mapping generally, but of more direct interest to agriculture is its application in soil and land class surveys. Aerial photographs have been used most effectively in agricultural assessments such as that conducted in the Murrumbidgee Irrigation Area in connection with the effects of drainage problems on tree health and condition in orchards.

Aircraft are likely to become increasingly important in property management, particularly in the

remote pastoral areas of Australia, and have rendered useful assistance in emergencies caused by bushfires and floods.

The Equipment of the Industry.

In common with the industry in other countries, agricultural aviation in Australia has been virtually a post-war development. Its establishment was assisted by the availability of trained pilots and cheap disposals aircraft. In all countries the industry became equipped during this period with light trainer-type aircraft, and in Australia and New Zealand the DH82 Tiger Moth became almost standard.

In many respects the Tiger Moth was an excellent aircraft for agricultural purposes. Its very low initial cost and the abundance of cheap replacement parts offset its very low pay load of about 400 lb. in the economics of its operation. As a type, however, it is obsolete and it has not been in production for many years. By about 1953 the maintenance of these aircraft was becoming difficult and operators in New Zealand began replacing their fleets with modern machines. Australian operators have not yet been able to replace their fleets and the position is now becoming critical.

TABLE 2.

AIRCRAFT UTILISATION : AUSTRALIA.

Twelve months ended June 30, 1956.

State of peration.	DH82 aircraft.	Other aircraft.	Total.
	hours.	hours.	hours.
N.S.W. ..	8,782	1,446	10,228
Queensland	1,464	109	1,573
S.A. ..	2,432	432	2,864
Tasmanian	504	..	504
Victoria ..	4,483	60	4,543
W.A. ..	1,576	..	1,576
Total ..	19,241	2,047	21,288

Source : Department of Civil Aviation.

In the early post-war years there were no aircraft specifically designed for agriculture. Manufacturers later introduced agricultural adaptations of standard light passenger types, such as the Cessna and the Auster, but these were generally unsuited to the heavy demands of agricultural work. It has only been during the last three years that specially designed and robust aircraft have become available for agricultural purposes.

At the same time techniques have advanced rapidly. For crop spraying in smaller areas the preference for lighter and more manoeuvreable types will probably continue, but in the distribution of superphosphate and in the spraying of very large areas the advantage is clearly with heavier machines. Their use not only reduces flying time and the number of pilots needed, but lessens the cost of handling materials. In New Zealand large aircraft such as the Bristol freighter, Lockheed Lodestar and Douglas DC3 have been used for superphosphate spreading. They are operating from central strips near rail facilities and handling the material in bulk. This permits considerable economies in the handling and delivery of the superphosphate to the farms and dispenses with the need for bags.

Advancing techniques and the introduction of more suitable types of aircraft appear certain to permit the reduction of the cost of aerial operations and to lead to an extension of the use of aircraft in agriculture. For instance, a representative charge for the distribution of superphosphate in New Zealand is 4s. 3d. per cwt. compared with 6s. 6d. in Australia (both charges expressed in Australian currency).

It will be apparent that the development of an efficient agricultural aviation industry in Australia will involve the employment of not one single type of aircraft but rather of a number, each adapted to a particular field of operations; in special

circumstances the helicopter may prove useful. In New Zealand, where the industry is now well equipped and a world leader, a range of aircraft is employed of which the following are examples:—

Light aircraft	Fletcher FU24	1,250 lb.
Medium ,,	DHC 2 Beaver	1,850–2,100 lb.
Heavy ,,	Douglas DC3	5½–6 tons
Helicopter	Hiller	

In New Zealand the virtual re-equipment of the industry has been achieved since 1953. This was assisted by the operation of a short-term loan scheme by the New Zealand Meat Producers' Board under which finance to the extent of £N.Z. 250,000 was made available. The scheme was instituted in 1954 and suspended in February 1956 when it was considered that its purpose had been fulfilled.

The Australian agricultural aviation industry is still mainly equipped with obsolescent types of light aircraft originally designed for flying training. It suffers acutely from lack of capital and has not been able during the period of severe import restrictions to obtain the newer more efficient overseas equipment which it requires to make its maximum contribution to rural development.

There is little chance of the Australian industry being able to perform its potentially important role in our agriculture unless suitable arrangements can be made for the financing of new equipment and its import where necessary from overseas.

IT PAYS TO TAKE CARE OF SHEEPSKINS.

Since careless flaying and drying can reduce the market value of your sheepskins by as much as 50 per cent., you will be well repaid for the care you give to them.

Mr. N. Jackson, Senior Adviser in Sheep and Wool, Department of Agriculture and Stock, says care of a sheepskin starts from the time the animal is slaughtered. To keep the skin as square as possible, follow the correct lines in ripping. Commence below the knees and open the skin down the forelegs to the brisket. Next, open the hindlegs from the hock to the crutch. Finally, when the carcase is hung clear of the ground, open the skin from the cod to the neck. Apart from opening the skin at these points and clearing the belly and brisket, you should not need to use the knife. Remove the skin by thumbing and punching to avoid damaging it with knife cuts.

After the skin has been removed, it should be dried flat and in the shade so that the air can circulate on both sides of the skin. The practice of throwing sheepskins over the nearest fence or rail, exposed to sun and hot winds, should be avoided. This is responsible for serious depreciation in the value of the skins owing to loss in weight and cracking of the flesh side. An open-air pen adjacent to the killing pen is a good investment. It should be roofed, secure from sheep dogs and contain drying racks. Two rails 2 ft. 6 in. apart secured to posts 6 ft. high make a suitable drying rack. Skins should be fastened to the rails, tail end uppermost, with nails or wire pegs.

Don't wait until the skin is dry before painting it with an anti-weevil preparation, and be careful to paint the mixture under all the folds in the skin. When the skins are dry, pack them flat in a storage shed, secure from dogs, until you are ready to market them.

As the middle portion of a sheepskin is the most valuable part, it is not advisable to pack skins for market in a wool pack, which necessitates folding the skins down the middle. Instead, pack your skins flat in bundles of about 12 full-woolled skins or 20 medium skins. Pack the skins in pairs, flesh side to flesh side, with the bellies slightly folded over to keep the pack as square as possible. Lay three light battens on the top and bottom of the pack and tighten the skins together by twitching three double strands of soft wire around the pack.

Records of Droughts

A recent study by the Bureau of Meteorology shows that Australia has, during the past 100 years, been subjected to at least seven major droughts and several others causing severe losses in restricted areas. That of 1895 to 1903 was undoubtedly the most disastrous.

The following is a summary of the findings of the survey:—

The climate in all parts of Australia is subject to large and irregular variations in rainfall and there is no reason to doubt that these will be repeated in the future, particularly in inland areas.

It may be argued that the extreme conditions experienced during the last century are unlikely to be repeated because of the measures that have been adopted to counteract the worst effects of drought and their capacity of further expansion. These include conservation of fodder in good seasons and increased storage facilities, the provision of adequate transport facilities for the economic removal of starving stock from drought-stricken areas, and the increasing use of irrigation. On the other hand, the rapid expansion of primary industries in the last 50 years has greatly augmented the vulnerability to drought. Had the 1895-1905 drought occurred in 1945-1953, its effects would have been much more far-reaching.

The incidence of droughts and dry periods shows no regular rhythm either as regards time of onset, duration or extent of territory affected. This indicates that there is little or no prospect of successfully forecasting drought from the assumed occurrence of rainfall cycles. The little work done on the study of synoptic weather types in drought periods suggests that droughts are related to the absence of an effective rain-producing mechanism in the general circulation of the atmosphere. The problem of forecasting drought, therefore, is one for international co-operation in the study of world weather, in particular the study of the processes taking place in atmospheric flow patterns and changes in the distribution of energy associated therewith above the earth's surface.

Major Droughts.

The major droughts during the past century and the areas principally affected were—

1880-1886—Victoria (north and Gippsland), New South Wales, Queensland (mainly coastal and central) and South Australia. Sheep and wheat areas were both seriously affected.

1888-1889—Victoria (north and Gippsland), Tasmania, New South Wales, Queensland, South Australia and parts of the agricultural areas of Western Australia. Wheat areas were chiefly affected.

1895-1903—Practically the whole of Australia, but most persistent on the coast of Queensland and in the inland areas of New South Wales, northern Victoria, South Australia, and Tasmania. It is today difficult to realise the magnitude of the effects of this drought on the country's economy. Usually referred as the 1902 drought, it was the longest and worst drought in Australia's history, in reality extending over seven years,

during which sheep numbers were halved to 50 million, cattle numbers reduced by 30 per cent., and average wheat yields in only one year in nine exceeded 8 bus. per acre.

1911-1916—Victoria (1913-1914), Tasmania (1913-1915), New South Wales (intermittent on coast), Queensland, Northern Territory, South Australia and Western Australia (1910-1914). Wheat, sheep and cattle areas were all affected.

1918-1920—New South Wales, Queensland, South Australia, Northern Territory (moderate intensity), and pastoral areas of Western Australia, Victoria and Tasmania. Wheat and sheep were principally affected.

1939-1945—New South Wales, Queensland, South Australia (particularly in pastoral areas), Tasmania, Northern Territory (where less persistent), and Western Australia (where less prolonged), and Victoria (mainly in 1940 and 1944). Sheep numbers were reduced by nearly 30 million and wheat areas were affected.

Lesser Droughts.

In droughts of lesser extent, greatest rainfall deficiencies occurred in the following years—

1864-1866 (or 1868)—The limited data available indicated that this drought was rather severe in Victoria, South Australia, New South Wales, Queensland and Western Australia.

1922-1923 and 1926-1929—Queensland, New South Wales, pastoral areas of Western Australia and South Australia.

1925-1929—Victoria, Northern Territory, Tasmania and Queensland, which lost 20 per cent. of its sheep.

1935-1938—Western Australia, Queensland, Victoria and southern and western inland areas of New South Wales.

1946-1949—Queensland, Northern Territory, New South Wales (1946-1947), Western Australia (1947-1950) 1947), Western Australia (1947-1950 in agricultural areas), and Tasmania.

1951-1952—Queensland, Northern Territory and Western Australia (especially pastoral areas, 1951-1954).

IDENTIFYING WEEDS.

A free weed indentification service is provided by the Government Botanist, Department of Agriculture and Stock, Brisbane.

In the case of smaller weeds, the whole plant should be pulled up and posted. If the weed is a shrub or very large plant, a piece about 15 inches long and bearing flowers or fruit should be sent. The name and address of the sender should be plainly marked on or inside the package, and each specimen should be identified by a number.

If any particular information is required, this should be requested in a separate letter.